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THE PREVENTION OF DISEASE

THE PREVENTION OF DISEASE

TRANSLATED FROM THE GERMAN

WITH AN INTRODUCTION BY

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IN TWO VOLUMES

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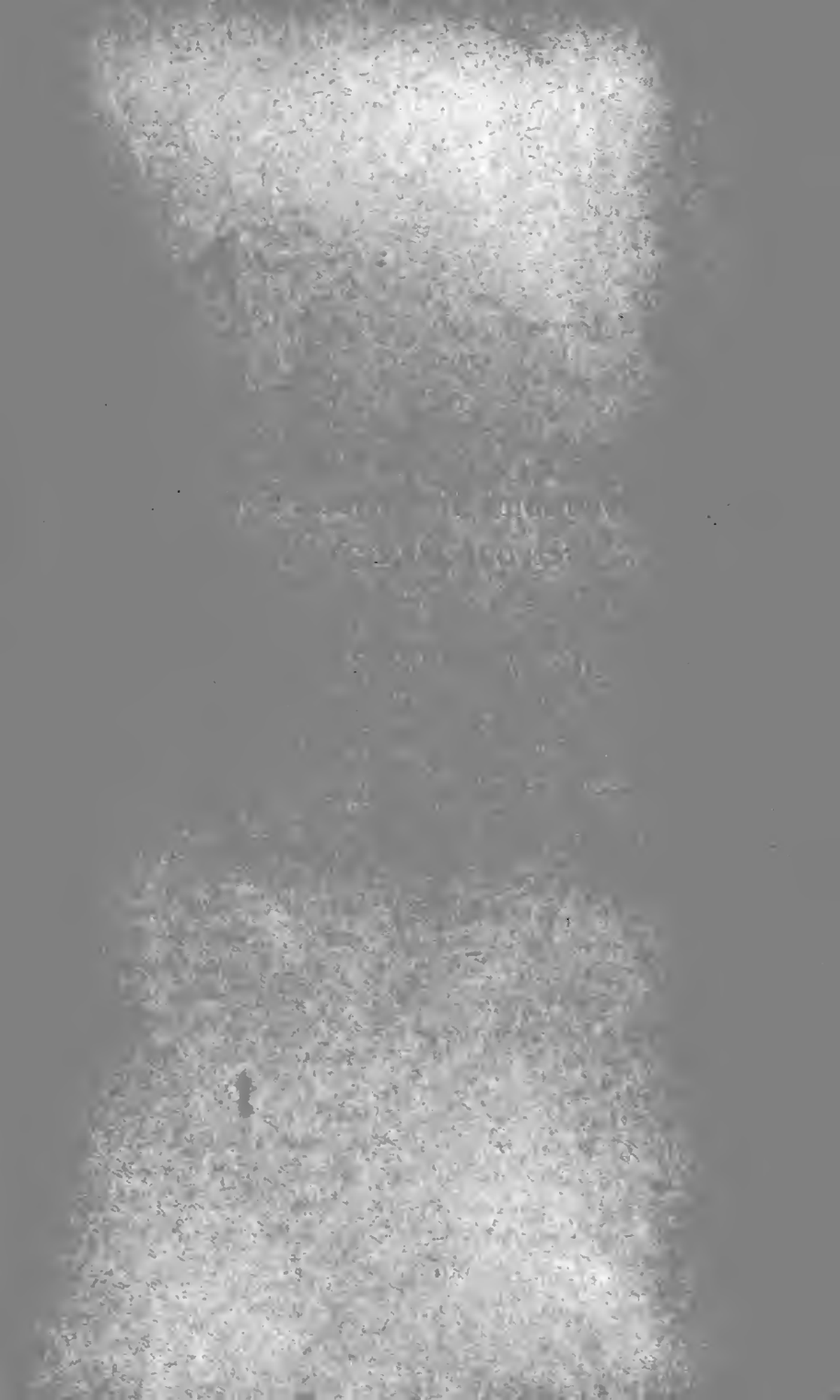
The Prevention of Disease of the Nervous System

BY

DR. WINDSCHEID

OF THE UNIVERSITY OF LEIPZIG



The Prevention of Disease of the Nervous System

The prevention of diseases of the nervous system is the more important because of the ever increasing number of cases of nervous disease at the present day. Unfortunately our ability to prevent these diseases is very slight when compared with their importance. The physician in treating a nervous disease needs to know more than in treating any other disease about the patient's social position, his occupation and his life, if benefit is to follow. To prevent a nervous disease the physician must be in a position which enables him to alter or modify all these conditions; but to what mortal man is it granted to do this! The physician's task of curing a nervous disease is often a very difficult and thankless one, because the best will itself is often frustrated by existing circumstances, and this is true even in a greater measure in connexion with the prevention of nervous disease.

I am conscious of the difficulty of the task before me, of attempting to describe the way in which nervous diseases may be prevented; this difficulty, which arises partly from the fact which I stated above, and partly because to write about the real prophylaxis of nervous disease would compel me to write a history of the present day and that no one desires me to do.

Moreover so much has already been said and written about this subject that it seems unnecessary to touch upon it again, did not this textbook, of which my work forms only a small part, require it for the sake of completeness. In all books upon nervous diseases prophylaxis is always

described, and every earnest medical teacher regards it as his duty to point out to his students how important prevention is in connexion with nervous diseases. Without entering into details about the numerous books on this subject, I would merely refer to the excellent account of the prophylaxis of nervous diseases by Stintzing in the "Handbook of Therapeutics," edited by Stintzing and Penzoldt.

I. The General Prophylaxis of Nervous Disease

The ground from which nervous disease may grow is an inherited neuropathic tendency. The importance of this neuropathic tendency is greatest in the so-called functional nervous diseases, especially neurasthenia and hysteria, which the laity designate by the term "nervous," and which practically form the chief part of nervous diseases. Organic nervous disease never arises from this neuropathic condition alone, whether the predisposition be inherited or acquired; other external factors are needed for the development of nervous disease, but these factors are more effective when grafted on to an already existing nervous predisposition. Thus regard to all neuropathic predisposition deserves much consideration in nervous diseases.

The neuropathic tendency may be inherited through nervous disease in the parents, which has affected the germ or the development of the germ, or it may be acquired through harmful influences which have rendered the nervous system less capable of withstanding injuries inflicted from without.

Can we then prevent a neuropathic predisposition from being inherited?

By neuropathic predisposition is meant, that the offspring of individuals suffering from nervous disease are born with some defective or faulty development, and are from the very beginning less strong than normal, so far as the nervous system is concerned. In forming an opinion as to which nervous diseases in the parents most tend

to cause a neuropathic predisposition, we must be very cautious.

Actual mental disease is most important of all; next come a number of the so-called functional neuroses, such as chorea and epilepsy; and lastly "nervosity." If in regard to mental disease there is clear evidence—such as that a near relative has died in a lunatic asylum, or that another was subject to convulsions—we are no longer upon the safe ground of "nervosity."

What is meant by "nervous"? The idea conveyed is very elastic, and we should therefore hesitate in forming an opinion when it is said that a person is "nervous." But it is otherwise when other additional statements are made at the same time; thus, the mother was nervous and always suffered from severe headaches; or she was nervous and suffered from bad attacks of migraine. Probably however no patients suffering from nervous diseases will be found upon close inquiry to have a family history quite free from nervous trouble. "We are all of us somewhat nervous," a renowned neurologist has said, and the truth of this statement cannot unfortunately be doubted. We might therefore discover a neuropathic predisposition in all cases of nervous disease, and ascribe the origin of the disease to it. But I do not consider we are justified in doing this. Recently the term nervous predisposition has been much misapplied, especially in France, where, for example, rheumatism is said to develop out of a purely nervous condition, so that rheumatic disorders in the parents are regarded as giving a neuropathic predisposition. The occurrence of many cases of nervous disease, especially of mental disease, may, I think, alone be regarded as giving a neuropathic predisposition; and in addition to these, the occurrence of convulsive disorders, such as epilepsy and chorea, and lastly severe forms of neurasthenia which have made necessary the temporary relinquishment of occupation. The statement that some one in the family was "nervous" does not justify us in making the diagnosis of neuropathic predisposition.

But that there is such a predisposition is a fact. What

then are the prospects of prevention? Theoretically the question may be simply answered: an individual with a nervous predisposition should not marry, and thus will avoid the risk of having nervous offspring. This demand is Utopian. Indeed it is certain too that the offspring of a neurotic parent need not necessarily suffer from any nervous disease himself, and his own children may be of perfectly sound nervous constitution. In these cases the physician is however seldom asked for advice. His advice is certainly not asked for in mild forms of nervous predisposition but generally in cases of nervous predisposition when there has also been some severe nervous disease in the parents. It is not an easy question to answer, and cannot be answered in the same way for all. If there have been several cases of mental disease the answer is easy; but these cases do not fall within the range of this section, and will be discussed under the Prophylaxis of Mental Disease. But is every otherwise healthy individual, one of whose parents may have suffered from some nervous disease, to be advised not to marry? That would certainly be going too far. If this were so it would be right also to advise all individuals one of whose parents may have suffered from tuberculosis not to marry—yet how few families there are which are completely free from tuberculosis!

The matter is somewhat different in cases where the children of some nervous parent are themselves affected more or less with nervous disease. Such individuals often go to the physician to ask him for advice about marriage, and whether there would be risk of their children suffering from nervous disease.

Here again it is not always easy to form an opinion. There are certainly cases where it is our duty to prevent marriage if possible, but we must certainly not advise against marriage under all circumstances. It is not absolutely certain that the children of such marriage will suffer from nervous disease, and for some nervous people marriage is a direct and valuable means of cure. I do not think this sexual side of the question is of the importance which the laity think it is; nevertheless sexual intercourse some-

times has an excellent effect upon certain nervous conditions. Above all, the more regular life, the better food which the young man gets when he has his meals at home instead of at a restaurant, and the satisfaction which a happy marriage brings, all tend to quiet and to cure his nervous condition. But the physician is unable to guarantee that the marriage will turn out satisfactorily. Finally, even when the physician feels in duty bound to advise against marriage with an individual suffering from nervous disease, who can answer for it that love will not prove stronger than medical authority?

It follows from these facts that it is very difficult, indeed almost impossible, to prevent neuropathic predisposition from arising by forbidding individuals suffering from nervous diseases to marry. The physician is generally powerless in the matter. But as there is no other way of preventing such predisposition except by forbidding such individuals to marry, it follows that prophylaxis of the inherited tendency is extremely imperfect.

It is necessary to refer to the question whether by forbidding marriage between two individuals who are closely related it is possible to prevent a neuropathic tendency in their offspring. There is no doubt about the fact that repeated marriage among members of a family will produce children who are weakly and who for the most part suffer from nervous disease. A number of aristocratic families are notable illustrations of this fact. The physician can often speak a decisive word in these cases; but one must not speak of the danger as if it were quite universal and without exception, and should rather seek to prevent these marriages by enlarging upon the cases in which these dangers have manifested themselves repeatedly. There are however a large number of cases of marriage between individuals who are nearly related by blood the offspring of which have been endowed with extraordinarily strong nervous systems.

Supposing now that there is no nervous predisposition, that the individual is born with a perfectly sound nervous system, what can then be done to prevent him becoming affected with nervous disease? The answer to this question

would include the whole of the hygiene of the nervous system, because only by living an hygienic life can one remain free from nervous disease. But what is understood by an "hygienic life"? And is it possible for each to arrange his circumstances and his work that he may fulfil the requirements of hygiene for his nervous system? Here we meet with an endless number of difficulties which oppose obstacles to the true prophylaxis of nervous diseases. In the following account we shall refer only to the most important points in regard to the hygiene of the nervous system.

The prevention of nervous disease is attained first of all by a sensible bringing up of children. The parents are entrusted with the sacred duty of maintaining the soundness of the child's nervous system by educating them rightly. Much, very much, might be said upon this subject, but a full description is beyond the scope of this book, and belongs rather to the subject of education. A few points only will be selected, which are of medical interest in physical and mental training.

The first point in connexion with the hygiene of the nervous system of the child is to ensure sufficient sleep. Children should go to bed early and should be got into the habit of going to sleep at once. I do not consider it necessary that they should from the very first be accustomed to a perfectly quiet room. In the country there is generally quiet, but our children brought up in large towns should become accustomed to sleep regardless of external conditions, because it will not be possible to silence all noises during the whole of their life when they want to go to sleep. To strengthen their nervous system, we should let them early get accustomed to going quietly to sleep though there is a little noise outside, and we must not think that the outside noises lessen sleep. Naturally we must not carry this to extremes. The child should early be accustomed to going to sleep without any artificial darkening of the room; moreover it must not be accustomed to going to sleep only when a nightlight is burning. The sleep of a normal child should be independent of such externals, and much may be done to preserve the normal state of the

nervous system if the child is not artificially made to be a slave to certain habits of sleep. The amount of sleep required differs according to the individual. Little children up to school age require quite ten to twelve hours' sleep every day to maintain the nervous system in a healthy condition. When the first earnest work of life comes to the child in the shape of school, the hours of sleep will generally be shortened by these new duties, but the child should have ten hours' sleep daily during the first few years of school life. Above all it is necessary, during the first years of school life, to continue the regular early going to sleep, so that the injurious effects upon the child's body, which are unavoidable during early school life, may be redressed by the most physiological of all means, normal sound sleep. The child who goes to school without having had sufficient sleep injures his nervous system by the struggle between bodily weakness and mental attention, and when this recurs frequently severe nervous disturbances are generally the result.

Besides sufficient sleep we must see that the child gets sufficient bodily exercise. Children should be out in the fresh air for several hours every day regardless of weather, and should early become accustomed to endure wind and rain. During school years regular exercise is of great importance. In this matter Germany is unfortunately far behind other countries, especially England and America. Modern school games are a great step forward in the hygiene of the nervous system, and there is every reason for thinking that the nervous system may be much strengthened by these subsequently. Faulty development may be removed thereby, and it is much to be desired that all such regular bodily exercises should be supervised by an adult. For other reasons too, in the interests of the hygiene of the nervous system, the bodily exercises of children need supervision. All games and sports carried to excess, be they what they may, will later tell upon the nervous system. Cycling carried to excess by children must especially be mentioned; in my opinion it often sows the seed for future nervous trouble.

Further, to strengthen the nervous system and prevent the development of nervous disease, the body must be strengthened by cold water from early childhood. But here too we must warn against extremes. It is quite wrong to attempt to "harden" very young children by cold douching —the reverse effect is generally produced, because children so treated are apt to take cold and lose all pleasure in the daily use of cold water, which when they are older is really a most valuable aid. Unfortunately the extreme measures of Kneipp have done much harm among the laity in this respect.

This means of strengthening the body is best carried out by washing the child in the morning or evening with cold water, in the winter in a room which is warmed—either washing the separate parts of the body in turn, or still better by a sponge bath in which a large sponge well filled with water is taken and squeezed out first over the chest and then over the back of the child as he stands undressed in the bath. During the years of school life this should be done early in the morning directly after the child gets up, to brace up the nervous system. Older children may also go regularly to the swimming baths in the summer. It is also good for the nervous system that the child should early learn to swim, and the sooner it begins to learn the more easily will it learn. But I would not advise that a child under seven years of age should be taught swimming; the body should first be well strengthened. Great mischief, permanently affecting the nervous system, is often wrought by allowing children to remain too long in the water at the baths in large towns. In the interests too of the nervous system we must warn against the use of warm douches, so often seen in baths. If a child is well, a warm bath once a week for cleansing purposes is all that is required in the use of warm water during childhood; to give a warm bath more often than this may be necessary for a diseased nervous system, but it will only weaken a strong one.

The much disputed point whether overwork at school is the source of nervous diseases does not fall within the scope of this work. It is obviously wrong that children should

sit at their lessons till evening or even till night. The prevention of this evil is a matter for the school and for the parents, since it occurs mostly because the child does not know how properly to divide up its work. Regular mental exercise which is adapted to the child's age never does any harm to the nervous system, if it is varied with sufficient bodily exercise. To bring up the child early to orderly mental work, through the school, is a most valuable means in the hygiene of the nervous system. The school by itself never makes a healthy child nervous.

An adequate diet is essential to keep the nervous system healthy, and it needs especial attention during childhood. Milk should be regarded as one of the principal foods of the child, and this excellent food should not be replaced by coffee in the morning. Under all circumstances coffee acts as a nerve poison to the child and should not be given, and the same is true of tea. The rest of the child's diet should be a mixed one, with but little meat. Not that it is necessary to bring children up as vegetarians; although during childhood an exclusively vegetarian diet is to be preferred to a diet containing excess of meat which is so common in our civilized life. In the interests too later of the hygiene of the nervous system in regard to diet, children should be early accustomed to eat all that is given them and should be educated to look upon eating as a duty, not as a pleasure which may be followed at will.

Above all total abstinence from alcohol is an unconditional necessity if the child's nervous system is to remain sound. It is almost incredible how many mistakes are made in this respect among the higher ranks of society. "The child is weak; it must have wine," is a phrase which has done very much harm. The family physician, of whom unfortunately there are now fewer and fewer, can explain to the parents and get them to understand this.

The parents can do much to prevent injury to the nervous system by keeping a watch over the reading of their children. The child whose imagination is already sufficiently exercised by the thousand new things which it has to learn, should be kept from much reading which excites the mind

still more. For the sake of keeping the nervous system healthy, too many books should not be put into the hands of the child. Our modern life in itself brings even to childhood a constant succession of fresh impressions. These cannot be avoided unless we withdraw from the ordinary conditions of life. But we can take care that the impressions made by reading are kept very simple, and this can only be done by not overwhelming them with new books before they have mastered the old. The choice of reading is an important matter too, but we cannot give any general rules. The simplest reading is the best, and under normal conditions the child should first be given some of our beautiful fairy tales which occupy its imagination sufficiently without exciting it. My experience is that, among excitable children more especially, tales of robbers and Indians do much harm. Lastly, children should not be allowed to read up to a short time before going to bed, for the reading may set up restless dreams, which always injure the nervous system.

The endeavour to form the child's character will also fall within the range of the hygiene of the nervous system. Education can do much to remove the wrong tendencies of the will, which later become the ground for nervous conditions. Self control cannot be taught too early to children —an energetic opposition to harmful impressions, an education of the mind to rise superior to external influences. It is impossible to lay down general rules in this matter; they must be individual.

The child's nervous system may further be guarded by keeping the child from too early participation in pleasures which are only for adults: such as concerts and theatres. Such amusements make too great demands upon the imagination and necessitate being up late at night, thus also acting injuriously by shortening the hours of sleep. Unfortunately this is very difficult to attain, especially among the lower classes. The parents want to amuse themselves on Sunday afternoons and evenings—a perfectly justifiable wish. There is no one to leave at home with the children, and they are allowed to go with the parents,

and experience that which is not suitable at their age; at last however nature asserts her claims and the children fall asleep, though not under the normal conditions for sleep. And thus on Sunday evenings in large towns, we see the father with one child asleep in his arms, and the mother close behind wheeling a perambulator in which there is a still younger child asleep. This is a mere mockery of the right way of bringing up a child.

Lastly, reference must be made to taking young children when going on long journeys. It is quite right that school children should be taken into the country in their holidays, where they can spend a few weeks in the fresh air, free from school tasks. But by taking their half-grown children with them, travelling from place to place and even into foreign countries, parents commit a grave error, and act against the interests of the hygienic life required by the nervous system. This concludes all that need be said here about hygiene of the nervous system during child life.

The task before us, the prophylaxis of nervous diseases, increases when the time comes for entering upon one's vocation in life, or preparing for it. Only he is happy who likes his vocation and derives pleasure from it, and much "nervosity" results from following occupations which are forced upon the individual or are taken up by him against his will. Here again the physician is often confronted by circumstances against which he feels himself powerless; but whenever he can, it is his duty to raise his voice in favour of choosing a suitable vocation for the youth. Above all parents should be warned against the tendency of letting young people study though they are not at all adapted for it, and of forcing children from false ambition into vocations for which they are quite unfit, and which lay the germ of nervous diseases.

The years of the storm and stress of youth come. Theoretically much may then be done in regard to the hygiene of the nervous system, practically however measures have to adapt themselves to circumstances, and too much must not be expected.

Wer nie verliess der Vorsicht enge Kreise,
Und wer aus seinen Jugendjahren
Nichts zu bereuen hat, nichts zu beklagen,
Der war nie thöricht—aber auch nie weise.

He who never left the narrow ring of prudence,
And looking backward o'er life's early years
Can see nought to regret and nought which he laments,
Has never acted foolishly—but also never wisely.

So writes the poet, and the words convey a deep truth. In any individual it will depend very much upon his education and upon the moral hold which this has upon him, whether he will guard himself against those excesses which are so injurious to the nervous system during the years of youth. But are we then to shut up our young people and compel them to live a secluded life? Certainly not: we should only thereby prepare the way for many nervous diseases. No sensible man will deny that the requirements of life in the youth are not the same as those of the full grown man. And so long as he does not constantly seek excess in his pleasures, there is no reason why the ascetic plan of life should be held up before him. The point at which excess can be said to begin is a matter which must be settled by the parents or the physician. I find the following a valuable guide: the idea of work must never be lost, and the feeling that life is meant for work must gradually be made to outweigh the thoughts about the pleasures of life, thus will the hygiene of the nervous system gradually fulfil its object. The riotous liver will suffer from nerve disease, the consciousness of having done his duty fails him, and by the struggle between frivolity and duty, in which the former generally wins, the seeds of injury to the nervous system are laid.

Still more difficult is it to point to any general hygiene for the nervous system in later life, when the demands upon the individual by his vocation in life have to be considered. We can only give a few general hints.

Conditions injurious to the nervous system are met with more or less in every calling. Mental overstrain is just as injurious to the nervous system as bodily over-exertion;

but he only who works his utmost will be able to succeed in his calling, and therefore in all work there lies the risk of developing nervous disease. In some individuals the injurious effects upon the nervous system appear sooner than in others; in some they never appear at all; but this cannot be determined beforehand. It is often very difficult to cope with those injurious effects which are the result of the vocation, especially when the means of existence for any individual depend upon that particular vocation which cannot be replaced by any other. We cannot tell overworked employés in business houses to avoid the bad influences which daily act upon them and live a life which is hygienically correct for the nervous system; to do so would be to deprive them of their means of a livelihood. This is true too of brain workers. The educated man whose scientific work makes great demands upon his nervous system, the diplomatist, and the merchant, who live continually in mental activity, as well as in physical activity, become "nervous" through their work; but to remove them permanently from their work would be even more injurious to their nervous system, for they are accustomed to work and would be worse if they had nothing to do. The physician can merely counsel moderation, and can prevent the injurious effects by advising suitable changes from mental to physical work and the reverse. How this is done in any case is of little moment, and must be decided separately for each. In addition there are general hygienic measures which increase the capacity of the body to resist these bad influences; these are sufficient sleep, suitable food and care of the body.

For the hygiene of the nervous system it is very valuable to have regular holiday tours; especially does the man who uses his brain require such holidays. Of course even travelling may convert a valuable hygienic means into one which will injuriously affect the nervous system, if it is a rapid travelling through foreign lands with a constant succession of new impressions.

Nervous diseases which are caused by grief, sorrow and excitement cannot be prevented. Life is not yet perfect,

and whoever lives has to struggle, and traces of the struggle are seen in some form or other in all. This can only be minimised by leading a rational hygienic life which enables the body and mind better to resist the imperfections of human life.

Excesses are important factors in causing nervous disease at this age: more especially the notorious triad,—alcohol, tobacco and sexual excess. How can excesses in these be avoided? The simplest answer would be:—avoid the exciting causes—do not drink, do not smoke, do not seek sexual indulgence. These are extreme views, and nothing is accomplished by extremes.

In regard to alcohol, there are a number of specialists of nervous diseases who regard alcohol as a poison to the nervous system under all circumstances, and are of opinion that alcohol should be entirely avoided in nervous diseases. I cannot agree with this view. Certainly there are cases where an individual of special constitution and predisposition feels decidedly better and his nerves stronger when he takes no alcohol. Thus much may be granted, but no general conclusion can be drawn therefrom which is universally applicable. Experience proves that a large number of men can take a certain small quantity of alcohol without injuring their nervous system, and feel extremely well, in fact better than when we deprive them of this small quantity of alcohol. They should be permitted to have this enjoyment so long as it produces no injurious effects. We are equally justified in stating that other substances too, which are used in civilized countries, such as tea and coffee, may cause nervous disease. Yet it would never occur to any physician to order a person not to take his customary morning coffee, because he has been taking too much coffee or because coffee may produce certain nervous conditions in some one who happens to be very susceptible to its influence.

A distinction must also be drawn between the various periods of life. It cannot be doubted that many drink too much in their student days; the difference is that some continue this abuse after their student days, while others

directly they enter upon the serious business of life know how to be temperate and to control their appetites. I am not, of course, in favour of excessive drinking during student life, because I am well aware that there are cases in which excessive use of alcohol in early life has laid the foundation for nervous disease later, but to forbid beer being drunk at all because excessive drinking may later produce injurious effects upon the nervous system, would be going to the other extreme. There is every reason why, for the sake of a strong future generation, we should reduce so far as possible the use of alcohol in youth, but I am convinced we shall do more in this way than by compulsory total abstinence. The same remarks apply to nicotine. How different is the tolerance for this substance among different individuals needs no further mention. Many men use large quantities of tobacco every day of their life without injuring their nervous system in the very least, while others would suffer very severely if they used as much. Here again commonsense prophylaxis must be adapted to the individual: a general warning against excess should be given, but it is impossible to lay down general rules about the quantity which would be excessive for any one individual.

Much more than is generally thought can be done to prevent nervous disease by observing hygienic rules in smoking. It is particularly injurious to smoke upon an empty stomach, because nicotine is absorbed much more quickly and in much larger quantities by the empty than by the full stomach. Many smokers have a bad habit of biting the cigar and thus allow the tobacco juice to run into the mouth and doubtless they are more likely to be strongly affected by the nicotine. The smoking of cigarettes is most injurious of all and readily gives rise to nervous troubles and to neuralgia. The chief evil of cigarettes is that by reason of their small size they are easily used in excess. There is certainly no objection to two or three mild cigarettes daily.

Finally, to prevent injurious effects upon the nervous system, smoking should not be begun at too young an age.

In connexion with the sexual functions, there arises the important question of the significance of masturbation in the development of nervous disease. Without entering into particulars about the degree in which nervous disease may be produced by onanism, it must be definitely stated that masturbation must be overcome and prevented for the sake of a healthy nervous system. The duty of parents and friends cannot be too strongly impressed upon them, and it is very important that the growing youth should early receive commonsense instruction, because onanism is always first developed through bad example. In later years excess in coitus has to be taken into consideration. Here again no hard and fast line can be drawn which is suitable to all. An amount which produces serious nervous disturbances in one may be perfectly harmless to another, and every man with commonsense will soon find out by experience the amount which is suitable for him. One prejudice must however be combated: abstinence never causes nervous disease, but excess in sexual intercourse causes it in many cases. In the man nature provides a way in which compensation is normally made by involuntary ejection of semen; in the woman we need not take into consideration a want which is not felt before marriage.

The most important factor we know that causes the development of nervous diseases is syphilis, and the prophylaxis of syphilis should form the chief part of the prevention of nervous disease. But it is not for me to write about the prevention of syphilis. This disease is fully described in a special section of this textbook; moreover the prevention of syphilis is a part of general social hygiene, and everything that can be said about its prevention will bear also upon the prevention of nervous diseases.

In addition to these causes of nervous diseases and their prevention, there are a few subsidiary points which have to be considered—subsidiary in so far as we are able to do very little if anything to prevent them. First, mention must be made of injury, which is undeniably the cause of many nervous diseases. Every sensible human being takes care to guard himself from injury, he would never willingly

expose himself to trauma, and against unexpected accidents we can do nothing. Great care should be taken to protect children from injury, especially from injuries to the head, which may later on cause nervous diseases. The same is true about taking violent colds and getting wet through, both of which are important factors in the aetiology of nervous disease. Here again no one willingly exposes himself to these conditions, but seeks to avoid them by living a generally hygienic life.

II. The Special Prophylaxis of Nervous Diseases

A. THE PREVENTION OF DISEASES OF THE BRAIN AND MEMBRANES

1. *Haematoma of the Dura Mater* (*Pachymeningitis Haemorrhagica*).

Prophylaxis has here very little scope. The most it can do is to treat and prevent alcoholism, which is often the cause of the haematoma. Patients who suffer from diseases which cause the vessels to give way readily, such as leucaemia, pernicious anaemia and scurvy, should be specially warned against injuries to the head: a fall upon the head may be sufficient in these cases to produce haematoma of the dura mater.

2. *Meningitis.*

Prophylaxis of inflammation of the arachnoid and pia mater is indeed only possible for the purulent form, and consists in carefully looking for and removing all inflammatory foci in the neighbourhood of the head, from which a meningitis might proceed; more particularly all purulent discharges from the ear should be treated, abscesses in the neck should be opened early, and inflammations of the scalp be surgically treated. Carious teeth should also be attended to, and it must not be forgotten that the infection may come from the nose and throat. Every injury to the scalp or skull must be thoroughly treated in accordance with the rules of antisepsis. Injuries in fencing must also be considered, for they are often entrusted to inexperienced hands and they may result in meningitis.

There is only one method available against tuberculous meningitis, and that is the radical removal as early as possible of all tuberculous deposits. Unfortunately great, often insuperable, difficulties stand in the way. It is possible often to stop the carious process in a bone or remove it by resection, or to remove tuberculous glands from the neck, but the physician is powerless in those sad cases where a tuberculous meningitis develops though the patient is apparently in sound health, and the autopsy shows that the cause was a caseous bronchial gland which had been the result of tuberculosis in childhood and had remained latent for many years. All we can do is to urge that a child with any predisposition to tuberculosis should from an early age be brought up in a way which will strengthen the body. Prolonged residence at the seaside is of the greatest value. During school years every precaution must be taken to prevent excessive mental strain; headache should be specially noted, for it is often complained of by tuberculous or weakly children, and is often the first symptom of meningitis. School work should at once be left off and the child be in the fresh air without any form of mental exertion. Unfortunately no one who suffers or has suffered from tuberculosis is proof against an attack of meningitis.

In epidemic cerebro-spinal meningitis prophylaxis consists in strictly isolating the patient. It should be noted that during an epidemic of cerebro-spinal meningitis, other infective diseases often prevail which may be followed by this disease and which therefore require even more careful treatment than usual: sometimes the disease develops out of an ordinary simple bronchitis. During an epidemic, care should be taken to avoid cold, particularly sleeping upon damp ground, because it is not inconceivable that infection spreads along the nerve sheaths of the peripheral nerves.

3. *Thrombosis of the Venous Sinuses of the Skull.*

Thrombosis of the venous sinuses is most often the result of general marasmic and cachectic conditions pro-

duced by cardiac weakness, profuse haemorrhages, chronic diarrhoea, malignant new growth, or wasting chronic infective and constitutional diseases, such as tuberculosis, syphilis, leucaemia, diabetes and pernicious anaemia. Prevention coincides with thorough treatment of these diseases. The acute infective form follows acute infective diseases or is the result of infective suppuration following some accident to the head, so that we can scarcely speak of its prevention. Generally we are quite helpless to prevent the development of sinus thrombosis, especially after infective diseases.

4. *Disturbances in the Circulation of the Brain.*

A number of nervous symptoms are caused by defective circulation in the brain; either by anaemia or by hyperaemia. These conditions may be primary, or secondary caused by other illnesses. Unfortunately an exact diagnosis of anaemia and hyperaemia of the brain is extremely difficult, and it is therefore difficult to give rules for the prevention of these conditions.

Cerebral anaemia may be only part of general anaemia, and may therefore be acute or chronic. In these cases the object of prophylaxis must be to prevent cerebral anaemia by using every available means to remove the anaemia by general dietetic treatment by drugs and by other means. Anaemic patients need careful supervision, because in them all intercurrent diseases accompanied by loss of fluids readily produce cerebral anaemia. Physiological processes must also be carefully watched: in women attention must be given to profuse menstruation, and prolonged suckling must be forbidden. To prevent cerebral anaemia, anaemic patients should not sleep with the head too high and must be careful to avoid all conditions which by causing hyperaemia of other parts of the body would produce cerebral anaemia, for example damp feet and getting wet through. Moreover cerebral anaemia may result from disease of the heart and vessels. Here the cerebral anaemia is generally of very acute onset, and its prevention depends upon treatment of the primary disease.

In cerebral hyperaemia a distinction must be drawn between the active and the passive forms. The active form arises through overstrain of the brain in consequence of excessive mental activity, of excessive action of the heart after physical exertion, or of a sudden rush of blood to the head from more distant parts of the body. It may also be due to poisons, such as alcohol, nicotine, caffeine, theine, amylnitrite, or nitroglycerine, or it may be produced by sunstroke. Lastly, there are people with a tendency to cerebral congestion in whom the hyperaemia is caused by some congenital vasomotor spasm of nervous origin. Prophylaxis of cerebral hyperaemia is possible in the latter case and consists in hygiene both mental and physical. All mental irritation by too severe mental exertion must be avoided, and there should be a wise alternation between mental and bodily work. This is especially necessary during the years at school. Care must be taken not to allow external conditions to make the mental work more difficult—such as small print, dark rooms, bad posture in reading or incorrect illumination. Bodily exercise to prevent cerebral hyperaemia should above all be methodical, such as gymnastics, especially those movements which tend to draw the blood down from the head; and sports, among which riding is especially good; while other exercises which make great demands upon the heart, such as cycling, skating, and excessive mountain climbing increase the cerebral hyperaemia and are less to be recommended and should be used with care. For all these forms of exercise the head should be covered to prevent sunstroke. It is necessary too to see that meals are regular and the digestion good. Alcohol in every form must be avoided; only very little smoking may be indulged in, and tea and coffee should be avoided.

Cerebral hyperaemia in people who tend to get congestion may be very satisfactorily prevented by suitable hydropathic applications. Those applications which draw the blood from the head are best, such as cold foot baths of short duration, rubbing down the whole body with cold water, and hip baths. In all these methods the head should be kept cool by a wet compress.

Passive cerebral hyperaemia is the result of obstruction to the return of the blood from the head as a consequence of cardiac lesions, or of obstruction in the pulmonary circulation. It may also be produced by rise of blood pressure through increased abdominal pressure, as in coughing, sneezing, or in straining at defaecation, or by compression of the jugular vein by a goitre, tumours, and by a collar that is too tight.

In the case of an excessively tight collar prophylaxis can do much, though often we have a hard and not always successful battle to wage against fashion and prejudice. The prevention of cerebral hyperaemia caused by cardiac and pulmonary disease does not belong to this section.

5. *Cerebral Embolism.*

The source of cerebral embolism is in most cases the heart, and prevention of this morbid condition depends therefore upon treatment of the original trouble. Great importance attaches to the energetic treatment of acute endocarditis by long continued rest both bodily and mental. Much can thus be done to prevent a vegetation from becoming detached. In many rheumatic cases the long continuous use of salicin, antipyrin, or salophen is indicated. That a heart lesion may at any time give rise to cerebral embolism is clear, so to prevent it general treatment must be adopted, and every effort must be made to prevent disturbance in the compensation, because experience has shown that this tends to produce cardiac thrombosis and embolism. Cerebral embolism may also be prevented by treating cardiac debility in acute infective diseases, and in disease of the muscle substance of the heart.

Atheroma of the aorta as a source of cerebral embolus is not a condition for which there is any prophylaxis except general measures. Mention must be made of the importance of certain syphilitic forms of aortic aneurism which may cause cerebral embolism. It is therefore most essential that aortic aneurism from this cause should be treated with antisyphilitic remedies. And further in all cases of

aortic aneurism complete rest of the body is needed to prevent cerebral embolism.

6. *Cerebral Thrombosis.*

The chief causes of cerebral thrombosis are arteriosclerosis arising from old age, from alcoholism or from syphilis. Against old age there is no prophylaxis; in alcoholism and syphilis the ordinary methods must be resorted to in order to prevent thrombosis, but they are not always successful. Further, cerebral thrombosis may arise from cardiac weakness; it either exists alone as the result of some organic affection of the heart or it may be combined with one of the conditions above mentioned which lead to cerebral thrombosis. This should warn us to be specially careful in any case where there is a suspicion of cardiac weakness and arteriosclerosis, and everything should be forbidden which would make too great a demand upon the heart, such as excessive bodily and mental exercise, alcohol and hot baths. If syphilis exists there must be no delay in using antisyphilitic treatment. This will often succeed in averting threatening cerebral thrombosis. The premonitory signs of thrombosis must be looked for, namely vertigo, headache and paraesthesia of the extremities. If the patient is suffering from syphilis, or there is any suspicion of syphilis, treatment by inunction should be commenced at once.

7. *Cerebral Haemorrhage.*

The prophylaxis of cerebral haemorrhage is identical with the prophylaxis of arteriosclerosis. The opinion is now held that all cerebral haemorrhages except those due to accidents, and these cannot be prevented, arise as the result of arteriosclerosis. To prevent cerebral haemorrhage it is essential to prevent arteriosclerosis from being developed. The conditions which produce this abnormal condition of the vessels are very various. Prophylaxis is of no avail in the senile form. Syphilitic forms can be prevented by early and energetic treatment of the syphilis. Those caused by lead and other poisons belong to the group of diseases due to occupation, and their prevention belongs

to hygiene. Those forms which arise in the course of renal and cardiac disease have no special prophylaxis. Lastly, arteriosclerosis may be the result of chronic alcoholism, and the prevention of this must be according to general principles. On the other hand prophylaxis is most useful for those forms which must be regarded as directly inherited. There are certain families in which apoplexy occurs very frequently, and the members of these families need to take every precaution to guard against it.

Cerebral haemorrhage as the result of arteriosclerosis rarely sets in without some external cause, but occasionally it occurs during sleep. As a rule the miliary aneurisms produced by arteriosclerosis give way under the influence of some external, generally a purely mechanical cause. When the physician has taught one who suffers from arteriosclerosis what are the dangers he ought to avoid, he has done all that is possible to prevent cerebral haemorrhage. It is very important to be on the look out for any symptoms which may arise during the course of the disease; the condition is often present for a long time without giving rise to any disturbance, yet evidence of compensatory changes may long be manifest. Often however premonitory symptoms of a threatening apoplectic attack are recognized fairly early. They are headache, giddiness, and a feeling of numbness in the extremities. The latter symptom is very important but is only slightly known. If therefore a patient comes to the physician complaining of these symptoms, and arteriosclerosis is diagnosed, whatever be its cause certain precautionary measures should be taken.

A miliary aneurism always breaks suddenly because the blood pressure has been considerably raised. The object of prophylaxis is therefore to prevent everything which would cause such increase of blood pressure. The patient's life must be regulated. Moderate meals should be taken and all overfilling of the stomach be avoided; the food should be easily digestible, and a regular evacuation of the bowels obtained. As to the kind of food it is best to restrict the amount of meat and to advise a more

vegetarian diet. The faeces should be soft because a great strain at defaecation has often caused cerebral haemorrhage. The patient should therefore be recommended to take some mild aperient, such as Marienbad, Carlsbad or Homburg water, or Hunyadi-Janos every morning before breakfast. But a warning must be uttered against stronger purgatives because they readily produce cardiac weakness, and this, together with the arteriosclerosis, is apt to cause thrombosis. All overstrain of the brain must be avoided, and all excessive mental activity. This point needs especial attention. Old people with arteriosclerosis feel, probably because of defective cerebral nutrition, some diminution of mental capacity, especially in the power of taking in fresh ideas. If the patient attempts to compel his attention, and revive the former capacity for thinking, a considerable flow of blood goes to the brain. Whenever possible it is therefore best to forbid mental activity altogether for a time. The combination of excessive mental work and excitement is particularly injurious: the wholesale merchant and the diplomatist with arteriosclerosis are therefore always liable to have cerebral haemorrhage. Night work must of course be altogether forbidden and care must be taken to secure regular and sufficient sleep. It is very injurious to be in hot ill ventilated rooms, therefore large assemblies and theatres should be avoided especially in summer. All playing of cards for money must be strictly forbidden, for this is more than a mere pleasure. Rational bodily exercise is important. To take a walk regularly at the same hour, avoiding the strong heat of the sun, is beneficial: the difficulty is that patients will not persist in this habit, because they find it tedious. It is therefore well to recommend a regular course of gymnastic exercises; this keeps the patient regularly occupied and with a duty to be performed. Those gymnastic movements are best which tend to draw the blood from the head; then those which act upon the digestion, and lastly those forms which regulate the cardiac action. On the other hand we must warn against indiscriminate gymnastic exercises performed without advice, particularly

by elderly people. There is no objection to gentle exercises without apparatus in moderation, but exercises with apparatus should be strictly forbidden, more especially those which alter the ordinary position of equilibrium of the head and thus cause a rise of blood pressure. This is true too of all sports; everything which raises the heart's activity must be avoided: cycling, games with balls, lawn tennis and rowing. There is no objection to riding if the patient is a skilful and moderate rider, but it may do harm if begun only after arteriosclerosis has developed.

Much harm may be done by the use of cold water. Patients with arteriosclerosis and headache and a feeling of lassitude instinctively feel a need of refreshing themselves by cold water, and little suspect how dangerous its incautious use is to them. Unfortunately this desire is often supported by unconscientious quacks and other nature healers, and alas! also by some doctors who empirically and without previous knowledge recommend cold water as the only remedy for suffering humanity. All cold applications, such as cold baths, rubbing down with cold water, and cold sitzbaths, must be avoided, because the effect of the cold upon the cutaneous vessels causes a strong contraction which sends the blood inwards to the internal organs, especially the brain, and produces a great rise in blood pressure. The only cold applications which may be recommended are brief cold foot baths at a temperature of 55° to 60° F., lasting one to three minutes. The head should previously have been cooled by a cold wet cloth and should be covered with a cold compress while the foot bath is being taken. Even more dangerous than the incautious use of cold water is the use of hot air and vapour baths for all who suffer from arteriosclerosis. They are often taken instinctively, especially for the above mentioned numbed sensations of the extremities, which are often thought to be "rheumatic" and are treated with vapour baths by the advice of some friend. Vapour baths and arteriosclerosis are absolutely incompatible, and it should be a rule, though it is difficult

to carry it out, that no vapour bath should be given except the patient has been previously medically examined. The sudden deaths which occur repeatedly every year in vapour baths but are kept silent from business motives show the need for making such a rule.

Patients with arteriosclerosis may take warm baths with perfect safety, that is a simple bath at a temperature of 85° to 90° F. But care must be taken that the bath room is not overheated, because the hot moist air readily produces increase of the blood pressure. Unfortunately this overheating of the bath room is an evil to which those who bathe in private bath rooms and often also in public baths are exposed, and arises from the fact that for reasons of economy the bath rooms are made too small.

Chronic alcoholism is a great danger for many who suffer from arteriosclerosis. The condition of acute intoxication is particularly dangerous, because the sudden enormous increase of cerebral pressure brings with it the danger of haemorrhage. The patient must be solemnly warned against drinking much. But even apart from such occasional excesses the use of alcohol must be restricted to a minimum. It is not necessary that the man accustomed to a moderate use of alcohol should suddenly give up taking any. On the contrary a glass of light moselle wine or of red wine at meals merely stimulates and strengthens and can do no harm. But all wines which contain much alcohol should be avoided, such as port, sherry, champagne, or generous Hungarian wines. Caution should also be observed in the use of nicotine. Here too habit and custom have to be considered. There are men with arteriosclerosis who from youth up have been habitual smokers and have used large quantities of tobacco daily without any injurious results. Still the physician should pay attention to this point, and if smoking has not yet become such a passion that it cannot be given up or can only be given up in part, he should urge reducing the smoking to the smallest possible amount. Special warning should be given about the immoderate use of cigarettes which are much more injurious than cigars.

Lastly, attention must be given to the subject of coitus. On account of the excitement associated with coitus there is a great flow of blood to the brain, and this may cause a miliary aneurism to give way. Coitus is especially dangerous in old people—and most who suffer from arteriosclerosis are old—because in addition to the mental excitement excessively great physical exertion is made owing to loss of potentia coëundi, and sad cases of apoplexy sometimes occur on the night after marriage in old men who have only late in life commenced to enjoy the pleasures of married life.

Finally reference must be made to those cases where apoplexy sets in without any warning or at night. It is generally assumed that the dorsal posture at night is responsible for these nocturnal cases, because the blood cannot flow so well from the head in this position. To prevent this it is well to advise those who have arteriosclerosis not to sleep with the head too low.

8. *Cerebral Abscess.*

Prophylaxis is only possible in the sense that any suppurative focus near or on the skull should be removed as early as possible. This is especially true about suppurative otitis, which can be diagnosed early, and should be submitted to surgical treatment. About the time for operation surgeons and aurists must be consulted; from the point of view of the physician for nervous diseases operation should be undertaken when there are signs showing that suppuration threatens to extend to the brain: these are increasing coma, headache, vomiting, and occasionally the presence of optic neuritis. In addition to treatment of otitis, care should be taken to treat antiseptically all injuries to the head, because these may give rise to cerebral abscess.

9. *Cerebral Syphilis.*

It is a well known fact that the brain is the part most often affected in secondary and tertiary syphilis. Henschen records that among 754 syphilitics in the hospital at

Helsingfors 112 had cerebral syphilis. This cerebral syphilis can only be prevented by thorough and very early antisyphilitic treatment. It is difficult to say how far it is possible to prevent cerebral syphilis by these measures, but observations recorded in literature seem to show that most patients who get cerebral syphilis are those who have had very little or no antisyphilitic treatment. For the rest, prophylaxis of cerebral syphilis must be according to the principles of prophylaxis of syphilis detailed in a special section of this book.

Another question is whether, directly objective symptoms of commencing cerebral syphilis are manifest, it is possible to prevent further progress of the cerebral syphilis or to cure it by antisyphilitic treatment. Although this question does not, strictly speaking, belong to prophylaxis, but rather to the therapeutics of cerebral syphilis, yet it may here be referred to, because the initial symptoms of cerebral syphilis are mostly so vague and indefinite that one is obliged to try the effect of antisyphilitic treatment before being quite sure of the diagnosis. I am of opinion that in all cases in which there is a history of syphilis or there are doubtful objective signs of syphilis, the patient should be submitted to a course of antisyphilitic treatment. When syphilis has existed for a long time and has been very inadequately treated or not at all, it is necessary at once to start treatment with a view to prophylaxis directly symptoms connected with the nervous system appear. The most important symptoms are paralysis of the ocular muscles, differences in the pupils, abnormal reaction of the pupils, transient hemiplegia, weak memory and mental symptoms. In many cases it is possible to prevent further progress of the disease by energetic treatment by inunction, and a number of cases of progressive paralysis—and most such forms are the result of cerebral syphilis—are known in which an important and permanent remission was brought about. We should not be deterred by the numerous cases in which inunction has had no good result, but should regard it as a duty, seeing that there are no other therapeutic measures

for syphilitic brain affections, to use a drug which we know to act as a specific in syphilis, although we cannot guarantee in any given case that it will effect a cure. The only contra-indication to antisyphilitic treatment is when the patient is physically so run down that treatment by inunction would hasten the physical break-up.

In contrast with the great importance of antisyphilitic treatment in the prophylaxis of cerebral syphilis all other measures are quite subsidiary. It must be remembered that a central nervous system which has been attacked by syphilis is less capable of resisting those things which we know by experience to affect the brain injuriously, especially alcohol and sexual excess, and the patient should be warned of this. It cannot be positively proved that chronic alcoholism is a direct cause of cerebral syphilis, in the sense that syphilitic infection occurs more easily in an alcoholic, and later causes the development of cerebral syphilis; but this at least is certain, that when syphilis is present, repeated alcoholic excess favours the action of the syphilitic poison and thereby the extension to the brain, and that alcohol should be restricted as much as possible in syphilitics.

The same remarks apply to sexual excesses: these weaken the body and thus prepare the way for syphilitic affections of the brain, and moreover they make it possible for the patient to become again infected by syphilis.

Those who have syphilis should avoid all mental overexertion, and so far as possible all excitement and accidents to the head. The possibility of a traumatic origin of that form of cerebral syphilis characterized by progressive paralysis is not proved, though possibly a trauma upon a syphilitic foundation may produce the disease. Of course the prevention of trauma is not often practicable.

Other general measures must also be carried out, namely a regular alternation between bodily exercise and work, care of the body, and particularly of the nervous system.

10. *Cerebral Tumours.*

The prevention of cerebral tumours is only possible in

the case of cerebral gummata, and this has already been described in the previous chapter.

It is probably difficult to prevent tubercle of the brain; but when tuberculosis is present, obviously everything should be done to cure the disease thoroughly.

Secondary cerebral tumours may be prevented by early surgical removal of the primary tumour.

Trauma is of some importance in connexion with the prevention of cerebral tumours. It is the duty of every one to prevent accidents whenever possible. There are cases in which symptoms of cerebral tumour follow a very slight injury to the skull. It may therefore be possible to help to prevent the development of cerebral tumour by adequate care and attention even after the most trivial head injury. This is not easy to accomplish, because there is in most cases no open wound or objective sign left by the accident, and people therefore do not seek medical advice at all, or only later when subjective symptoms have developed. In a patient suffering from syphilis who meets with a head injury, we should as a prophylactic treat him again with antisyphilitic remedies. A similar course must, in a sense, be followed with tuberculous patients, especially children who have received any head injury; extra care should be taken, and energetic treatment of the primary disease be resorted to. The whole question of the possibility of a traumatic origin of cerebral tumours is still so obscure that we cannot say that appropriate treatment would, in any given case, have prevented the formation of a cerebral new growth.

11. *General Paralysis of the Insane or Progressive Paralysis.*

If one adopts the view that general paralysis never occurs except in syphilis, then the prevention of this disease is included in the prevention of syphilis or of the further extension of syphilis if already present, as has been detailed under cerebral syphilis. But if in addition to syphilis one recognizes other aetiological factors in progressive paralysis, then the scope for prophylaxis will be a

greater one. Without discussing the question whether one is justified in believing that syphilis is the only cause of progressive paralysis, we shall briefly mention the other factors said to be concerned in producing progressive paralysis, and their prevention.

In addition to syphilis we have to consider chronic alcoholism, great and prolonged mental excitement and trauma. The prevention of these is difficult. That chronic alcoholism should be avoided is obvious, apart from the possibility that it may cause disease. Certainly it is our duty to restrict the abuse of alcohol, and when possible to forbid it altogether to prevent the development of progressive paralysis. Among mental excitement we have to consider all forms of excitement combined with great mental overstrain. Here the physician is often unable to do anything, because he cannot alter the circumstances of the patient, but he can always point out the danger which lurks in mental over exertion, and endeavour to free his patients from it. As to trauma, the remarks are applicable which have already been made about it.

B. PROPHYLAXIS OF DISEASE OF THE SPINAL CORD

1. *Locomotor ataxia.*

Syphilis is doubtless the principal cause of tabes dorsalis, and to prevent it the syphilitic infection should be early treated. The same principles are applicable as for cerebral syphilis and general paralysis. The treatment should be both early and thorough. Unfortunately it is impossible to deny that, notwithstanding early and thorough anti-syphilitic treatment, tabes dorsalis has nevertheless appeared; yet energetic treatment of the primary infection must be urgently pressed in order as far as possible to prevent post syphilitic tabes.

Causes, other than syphilis, which are said to produce tabes probably are only subsidiary to syphilis. For these general measures only are applicable, namely, removal of the neuropathic tendency, avoidance of all alcoholic and sexual excess, colds and over exertion of the lower limbs. None of these however are special to tabes.

2. *Syphilitic Spinal Disease.*

For other syphilitic spinal diseases, such as syphilitic spinal paralysis, syphilitic meningitis and meningo-myelitis, the treatment is that given above for syphilis.

3. *Diseases of the Columns of the Cord.*

For the diseases of the columns of the spinal cord there is no prophylaxis. We do not know how they are caused: possibly there is some congenital tendency against which we are powerless. A few rare cases seem to develop after severe anaemia and cachexia—energetic treatment of the original trouble might possibly prevent the threatening secondary spinal cord disease, though proof has not and probably cannot be given.

4. *Hereditary Ataxy.*

To prevent hereditary ataxy—Friedreich's disease—is impossible, because doubtlessly there is here some congenital morbid predisposition of the spinal cord.

5. *Amyotrophic Lateral Sclerosis and Progressive Spinal Muscular Atrophy.*

The same remarks are applicable to amyotrophic lateral sclerosis and progressive muscular atrophy. These are conditions in which we may state probably with certainty that a predisposition is the sole cause, and that the occasional causes described, such as trauma, cold and overstrain are only provocative factors. In all these forms the most that can be done is to bear in mind that there is a neuropathic taint, and to aim at avoiding all injurious conditions which are apt to increase a neuropathic tendency that is already present or else to produce it.

6. *Acute and Chronic Anterior Poliomyelitis in Adults.*

Acute and chronic anterior poliomyelitis in adults, especially the former, is the result of an infection which is altogether unknown and therefore incapable of prophylaxis.

7. *Acute Myelitis.*

Something, though not much, may be done to prevent

acute myelitis, because this disease generally follows some acute infection, more especially acute infective diseases in the narrower sense of the term, such as pneumonia, typhoid, scarlet fever, variola, measles, diphtheria, erysipelas and influenza. Though we are unable altogether to prevent these infections and get rid of their poisons, yet something can be done to prevent the appearance of myelitis as a secondary affection, by treating the original disease very carefully and thoroughly. Yet we have often seen cases which have been very badly and inefficiently treated, and yet they have not been followed by myelitis, while others which have been especially well treated in hospitals have nevertheless developed myelitis. Still we must not disregard the great value of thorough treatment of the original disease.

The prevention of myelitis after gonorrhoea and syphilis belongs to the prophylaxis of venereal diseases.

It is extremely uncertain whether there is a purely rheumatic acute myelitis produced by cold and by wet, or a purely traumatic form: if they exist these forms can only be prevented by general measures.

8. *Multiple Sclerosis.*

If it is correct that multiple sclerosis is produced by infective diseases, what has just been said is here also applicable. This disease is probably also caused by metallic poisons, such as lead, quicksilver, copper and zinc, and its prevention belongs to hygiene.

9. *Syringomyelia.*

Syringomyelia is certainly the consequence of a congenital morbid predisposition of the spinal cord, probably some abnormal development of the cells of the central canal. There is therefore no prophylaxis for this disease. It is well however to bear in mind the recent observations that trauma may be the exciting cause of the disease, particularly injury affecting the back.

The development of the disease may under certain conditions probably be prevented, if the patient is kept in

the recumbent posture as long as possible after the accident and if any changes in the vertebral column which have resulted from the fall receive early and careful treatment.

10. *Compression of the Spinal Cord.*

Prophylaxis is of value to prevent compression of the spinal cord. In youth acquired kyphosis and other deviations of the vertebral column from the normal may be remedied by early orthopaedic and other appropriate measures, which may cure the bony disease and so prevent the development of secondary compression of the spinal cord. Every effort should be made to protect these patients from accidents: experience shows that a blow on a deformed spinal column may be the cause of the rapid development of compression of the spinal cord. I need not speak about the operative treatment of deformity of the spinal column, but the great impetus given of late years to the surgery of the spinal column makes it possible that these unfortunate patients with kyphosis may every year be more and more saved from the threatening danger of compression of the spinal cord.

For deformities of the spinal column caused by trauma the only means by which disease of the spinal cord can be prevented is prolonged absolute rest, combined sometimes with appropriate extension apparatus to remove the deformity early.

Compression of the spinal cord by tumours either of the vertebral column or of the spinal cord itself is beyond prophylaxis.

11. *Membranes of the Spinal Cord.*

Among diseases of the spinal cord membranes, the most common are syphilitic in origin, and to these reference has already been made. There is no possibility of prophylaxis for the other forms.

The prophylaxis of diseases of the spinal cord is in general very unsatisfactory. The reason probably is that in the development of spinal cord disease we have to fall back upon two main possibilities: congenital tendency and syphilis. All other causes are still obscure.

C. THE PROPHYLAXIS OF DISEASES OF THE PERIPHERAL NERVES

1. Motor Nerves

A. *Paralysis*

Paralysis of peripheral motor nerves may, broadly speaking, arise in one of three ways: by trauma, by cold, or by the action of poisons.

(*a*) The prevention of traumatic paralysis of peripheral nerves is but rarely possible. It has already several times been said that no one willingly exposes himself to trauma, and that the prevention of accidents in certain occupations belongs to the subject of hygiene. Prophylaxis is possible only in the sense that one tries so far as possible to minimise the consequences of the accident: thus, when the nerve has been damaged by a stab, cut, or bruising, a suture should be passed to unite the severed ends of the nerve, or, if it is only probable that the nerve has been severed, it should be exposed and its condition examined. The sooner the nerve ends are united by suture the better the prognosis of the paralysis.

Moreover the idea conveyed by the term trauma must not be too narrowly interpreted, so as to include external violence only. There are several forms of internal violence which are of great significance in the prevention of paralysis. A nerve may be compressed by a bone, as in a fracture, a dislocation, or by caries, or a tumour. A nerve may be pulled on or stretched by inflammatory processes in soft parts, as by scar tissue, aneurisms, tumours, or enlarged glands. For these cases timely operative interference is required, and in this sense the prevention of peripheral paralysis consists in the treatment of the parts in the immediate neighbourhood of the nerve.

(*b*) One can guard against cold, and no sensible being would willingly expose himself to cold any more than he would to trauma. True prophylaxis however of paralysis by cold is impossible because we are not sufficiently well informed about the essential pathology of this disease. The latest investigations show that in one form of paralysis from

cold, rheumatic facial paralysis, there is present a neuritis, which is most marked towards the peripheral parts of the nerve and decreases in intensity as we pass towards the central end. We may perhaps apply this to all paralyses from cold. The old teaching about an inflammatory swelling of the neurilemma is now abandoned, and we know that the cold, that is, the effect of a great difference in temperature, most affects the more exposed peripheral parts of the nerve. But why in one case a current of air impinging upon the heated face should cause paralysis, while in hundreds of other similar cases it does not, is a riddle which still awaits solution, and for the present we are obliged to fall back upon the theory that the nerve must be in a fit condition to be paralyzed by the cold. What this condition is is still obscure, and we are compelled to insert the unknown quantity x in our teaching about paralysis by cold.

(*c*) Paralysis of the peripheral motor nerves by poison is the result of a chemical process produced by certain metals; among the more important are lead, arsenic and mercury. The prophylaxis of such paralysis by metals belongs to hygiene and cannot be here dealt with. This is also true about paralysis caused by all other metals.

A further way in which poison may affect the peripheral nerves is in acute infective diseases. How far it is possible for us to prevent the virus from attacking the nervous system is very questionable. Often secondary peripheral paralysis has followed cases of infective disease which have received the best and most careful treatment, while it has remained absent in cases which have received no treatment at all, or have been under the worst conceivable surroundings. Whether the more recent specific treatment of acute infective disease with antitoxins prevents peripheral paralysis or diminishes its severity is a point not yet determined. Lastly, there are cases of paralysis of peripheral nerves which must be explained by auto-intoxication, that is by products which have been produced in the body, as in gout, diabetes, leucaemia, scrofulosis, and malignant new growth, and have probably reached the nerve by the blood stream. Here again prophylaxis is powerless, and

paralysis cannot be prevented even by the most thorough treatment of the original disease.

Prophylaxis is relatively most effectual for peripheral paralysis caused by chronic alcoholism and syphilis, because in both these diseases we know of means by which these diseases may be cured, and thus can prevent the development of paralysis. There are cases, especially in alcoholism, less often in syphilis, in which the first sign of the mischievous effect of the poison shows itself in the nervous system, and the patient seeks medical advice only when the paralysis is already present. And then naturally prophylaxis of the paralysis is not possible.

For the various forms of peripheral paralysis the following special prophylactic measures are available—

1. Paralyses of the ocular muscles are in by far the greater number of cases of syphilitic origin, and their prevention consists in treatment of the syphilis. Prophylaxis cannot do much in the so-called rheumatic forms. And it is powerless to do anything in paralysis of the ocular muscles caused by intra-cranial processes. Neither is it possible to prevent paralysis of the ocular muscles after acute infective diseases, especially diphtheria.

2. The prevention of paralysis of the facial nerve consists above all in early and adequate treatment of all catarrhal and purulent inflammations of the middle ear. If we can prevent the pus from making its way through into the aqueduct of Fallopius, in most cases no paralysis develops. Sometimes the tympanic cavity may be so reduced in size by the simple catarrhal swelling of the mucous membrane as to compress the nerve and so to cause paralysis. For the sake of preventing facial paralysis the most trivial affection of the ear should be at once treated.

Rheumatic facial paralysis can be prevented by avoiding exposure to draughts. What was said above about paralysis from cold is true of this also—we do not know why the paralysis supervenes. We are unable to prevent traumatic facial paralysis, except possibly that which is caused by forceps delivery, where pressure of the blade on the child's ear may give rise to facial paralysis. But it is seldom

practically possible in these cases to prevent facial paralysis; mostly one is concerned about other matters at the time, and the facial paralysis is of less importance than the life of the mother and child.

Lastly, facial paralysis may be caused by swelling of glands in the face and neck, as by parotitis, or swelling of the submaxillary gland, and these conditions require suitable attention and treatment. There is no possibility of preventing facial paralysis which is caused by disease at the base of the skull.

3. Nothing can be said about prophylaxis of the rest of the cranial nerves—the trigeminal, glosso-pharyngeal, vagus, spinal accessory and hypoglossal—because paralysis of these arises almost exclusively either from trauma or as the consequence of other cerebral disease.

4. There is also no special prophylaxis of paralysis of any of the nerves coming from the cervical plexus.

5. In connexion with the brachial plexus, prophylaxis is possible in the case of the nerve to the serratus magnus, because paralysis of this nerve is very often caused by excessive overstrain of the arms, especially when raising the arms against some heavy weight, as in cleaning windows or in gymnastics. When possible all such movements should be avoided.

6. Paralysis of the circumflex nerve may be caused by a dislocation at the shoulder, and dislocations and fractures in this locality should therefore be very carefully treated. There are also cases of paralysis of the nerves of the brachial plexus which are connected with a rheumatic synovitis of the shoulder joint; this is possibly a neuritis produced by extension of the inflammatory process to the nerve itself. Here prophylaxis is of use, if the primary rheumatic process is early treated, and passive movements are begun as soon as possible in order to remove stiffness, and thus perhaps prevent the disease from attacking the nervous system.

7. Paralysis of the musculo-cutaneous nerve has generally a purely traumatic cause, so that prophylaxis is not possible. The question might however arise as to the advisability of

timely operative removal of glands and other tumours in the supraclavicular fossa, which might produce paralysis of the nerve.

8. Paralysis of the median nerve follows dislocations and fractures of the arm, and these therefore require very careful treatment. Sometimes it is caused by an unskilful venesection, as the median basilic vein passes very close to the median nerve. Lastly it may be caused by over exertion in many trades, such as among joiners, locksmiths, ironers and cigar rollers. For those forms arising from occupation prophylaxis is possible: the special form of over exertion should be avoided, especially when the trouble has already begun. We are powerless to do anything in traumatic nerve paralysis, caused by blows, stabs, or division, or in infectious forms, especially puerperal neuritis.

9. Ulnar paralysis is very often due to dislocations and fractures at the elbow joint, and prophylaxis so far is possible. Traumatic forms cannot be prevented except those caused by a definite kind of work, as in coalheavers. They are in the habit of carrying very heavy sacks of coal upon the shoulder, in such a way that the hand is passed up to the shoulder, and the elbow is enormously hyperflexed, and the nerve is thereby stretched and torn. It is the duty of hygiene to prevent coalsacks being carried in this way. Infective ulnar paralysis, occurring in the puerperium or after typhoid fever, cannot be prevented.

10. Paralysis of the musculo-spiral nerve is mostly a pressure paralysis from pressure upon the nerve at the place where it passes round the humerus. This nerve may be pressed at this spot even during normal sleep, and sleeping upon the arm should therefore be avoided; though this is not always possible because the position is mostly unconsciously assumed during sleep. Another class of compression paralysis during sleep is caused by alcohol, when the drunken man falls asleep with his arm upon the back of the chair, and it is quite probable that the poisonous effect of the alcohol has made the nerve specially susceptible to pressure. It can only be prevented if some compassionate fellow drinker removes him from this dangerous position, and this is

scarcely likely because of the want of knowledge of the danger. There is one form of radial compression which can be prevented: the so-called police paralysis, which is caused by the handcuffs put by the German police upon a prisoner's arm; these may cause compression by their pressure upon the nerves, which is generally increased by the resistance offered by the man.

In the axilla, the musculo-spiral nerve may be compressed by any kind of tumour, which should therefore be removed, or it may be compressed by bad crutches which are not padded or are too hard. This can easily be remedied. Diseases of bone may also cause paralysis of the musculo-spiral nerve, especially the callus produced in fractures of the humerus. Surgical interference is here needed.

The last kind of traumatism which may cause paralysis of the radial nerve, or some of its branches, is the subcutaneous injection of ether or some other drug into the extensor surface of the arm. If the needle is passed deeply it is easy to go through some nerve twig. Some care is always required in this operation: the fold of skin should be well raised, and the needle passed into this only. Toxic radial paralysis after typhoid fever, septicaemia, or in the puerperium, is like all other similar forms beyond the reach of prophylaxis.

Alcoholic paralysis of the musculo-spiral nerve is a rare occurrence, and its prevention consists in treatment of the chronic alcoholism.

The frequent lead palsies of the musculo-spiral may be prevented by avoiding lead poisoning; this is again the work of hygiene. But there are generally other causes also at work which cannot be known beforehand, for often when all precautionary measures for the prevention of lead poisoning are strictly carried out, lead palsy or some other manifestation of lead poisoning will develop; yet when these precautions are neglected, the lead may have nevertheless no injurious effects. Evidently some individuals are more liable to suffer from lead poisoning than others, and nothing can be done to hinder this.

11. Paralyses of several of the nerves of the brachial

plexus are mainly of traumatic origin, and prophylaxis is therefore impossible. An important question that may arise is whether any tumours in the supraclavicular fossa need be removed.

12. Paralysis of the muscles of the back and abdomen is in most cases the consequence of spinal disease which cannot be prevented, or of progressive muscular atrophy which also cannot be prevented.

13. The anterior crural nerve may be paralyzed by direct injury, and this cannot be prevented except in so far as it is caused by a hernia which can be treated by a suitable truss. It may also be paralyzed as the result of fractures or luxations of the pelvic bones, conditions which require appropriate surgical treatment; or it may be the result of disease of the spinal cord or spinal column, and for these there is no prophylaxis. Paralysis of the anterior crural occurring in the course of diabetes can only be avoided by adequate treatment of the diabetes.

14. The obturator nerve may be paralyzed by a large hernia through the obturator foramen, and can be avoided by surgical treatment of the hernia.

15. Paralysis of the sciatic nerve is mostly caused by compression of the nerve in the pelvis by some morbid swelling which occupies the pelvis and so diminishes the available space: such as a tumour, aneurism, a gravid uterus, or faecal accumulations. The paralysis can be prevented only in those cases caused by chronic constipation, and these are rare. Paralysis of the nerve may also supervene from inflammatory processes of the various pelvic organs, and may be prevented by treatment of the inflammation. Lastly, it may be caused by disease of the spinal cord, and this cannot be prevented. Prophylaxis is impossible in traumatic paralysis of branches of the sciatic nerve, the peroneal and tibial nerves.

B. *Spasm.*

Spasm is produced by irritation somewhere in the motor tract, most commonly by irritation of the central or the peripheral nerve tract. It may be produced directly by a

lesion affecting the nerve tract itself, or indirectly—so-called reflex spasm—when the lesion affects some other part of the body, such as an internal organ or an organ of special sense, and probably reacts through the sensory path upon the motor nerve region.

This great variety of ways in which spasm may be produced is a great difficulty in prophylaxis. The difficulty is the greater because in most cases the cause of the spasm and the nature of the nerve irritation are wholly unknown. A number of spasmodic conditions doubtless arise from some nervous predisposition, and prophylaxis of the nervous condition, as before described, will at the same time serve as prophylaxis of the spasms. Moreover we know of spasms caused by general disease, such as anaemia, cachexia, or conditions of exhaustion, in which the occurrence of spasms may sometimes be prevented by effectual treatment of the main trouble.

Muscular spasms caused by disturbances of the circulation, especially of the brain, by anaemia as well as by hyperaemia, may be prevented by preventing these circulatory disturbances as described above.

Chemical sources of irritation, as alcohol, mercury, strychnine, or lead may likewise cause spasm. Their prevention belongs in part to hygiene, and in part it is beyond the range of possibility, because they are the result of contingencies which are unavoidable.

Prophylaxis is most effectual in those cases where the spasm is produced by direct irritation in the motor tract in consequence of an injury, a scar, a new growth, or a dislocation. These should be carefully treated, and where possible be removed by surgical means in order to prevent the development of spasmodic conditions.

Occupation neuroses, which must also be included under spasmodic conditions, may be prevented if the excessive use of one group of muscles can be avoided. Prophylaxis is unfortunately not very effectual—I refer more especially to the occupation neuroses among musicians—because it would mean the relinquishing of the occupation, and this is possible in very few cases. Something can however always

be done to prevent these conditions, in which doubtless there is always some nervous basis, acquired or inherited, and an attempt should be made to treat this nervous condition and thus counteract the unequal muscular overstrain.

Among the occupation neuroses writer's cramp is important both with regard to its aetiology and its prevention. This condition is probably chiefly to be attributed to overstrain of the muscles used in writing, that is, by too much writing. But as this excessive amount of writing is generally necessitated by the vocation of the patient, prophylaxis can hardly be of use as it would mean giving up the work. But there are other factors concerned which are also important in the prevention of writer's cramp. Above all there is the method of writing, with pens which are too fine or too soft, paper which is too hard, a bad posture, or a bad penholder. These details should be attended to by all whose occupation compels them to write much. And further, writer's cramp may be produced by disease of the tendons of the forearm, by pressure of cuffs or shirt buttons on the nerves at the wrist; and all these conditions, if present, should have careful attention in order to prevent writer's cramp.

To prevent writer's cramp general treatment of the whole nervous system is very essential, for we know how often a general neurasthenic condition, either acquired or inherited, is the main cause of writer's cramp, although it is started by some purely external condition. Treatment of this general condition belongs therefore to the prophylaxis of writer's cramp. Lastly we must refer to excesses in alcohol and in tobacco, which help to develop writer's cramp, so that these should also be taken into consideration in prophylaxis.

2. Sensory Nerves

Neuralgia

A nervous predisposition is always an important factor in the development of neuralgia, and treatment of the general condition is therefore part of the prophylaxis of this disorder. No special remarks are required about this. Those forms of

neuralgia which are met with in various morbid constitutional conditions, such as anaemia, gout, diabetes and leucaemia, may sometimes, though not always, be prevented by energetic treatment of the constitutional malady. In other cases the prophylaxis of neuralgia is best accomplished by treatment of diseases in the neighbourhood of the neuralgia. As an example we may mention treatment of the organs of sense to prevent neuralgia of the trigeminal. Affections of the eye are specially important in this connexion, simple anomalies of refraction as well as organic disease of various parts of the eye; catarrh and suppuration of the middle ear; adenoid vegetations and catarrh of the nasal cavity; and disease of the frontal sinus and the antrum of Highmore should also be borne in mind. Thorough treatment and if necessary removal of these abnormal conditions are required to prevent the neuralgia. Lastly, every local disease of an organ may cause neuralgia by affecting the nerves which supply that organ or those near it, and treatment of the local condition — mostly of inflammatory nature — will obviously prevent neuralgia. Further details cannot here be given.

The direct causes which may give rise to neuralgia are those mentioned above as producing paralysis of the peripheral nerves. They are trauma, cold and infection. All that was said above about their prophylaxis is applicable also to sensory nerves, and need not be repeated.

The following special considerations refer to special forms of neuralgia—

1. Neuralgia of the trigeminal nerve. The prophylaxis consists in not taking cold and not looking out of the open window of a railway carriage when the face is overheated, and so on; and in the careful treatment of infective diseases. The effect of malaria is specially important and may produce attacks of neuralgia for years afterwards, which are often characterized by appearing regularly at a given hour and day. Trauma of the face requires notice, even a slight injury should be carefully treated and made to heal thoroughly, especially fencing wounds. The importance of diseases of the special sense organs has already been referred to. Every

eye trouble should be carefully investigated and treated. Much may be done to prevent neuralgia in later life if defects of vision are treated in childhood. In the case of the ears, earache should suggest examination of the ears, and aural discharge should be thoroughly treated. Chronic catarrh with secondary swelling of the mucous membrane requires treatment, and adenoid growths in children should be early removed. The teeth are very important. Their care belongs really to hygiene, but reference to them must be made because they often cause trigeminal neuralgia. It is quite certain that dental caries may reflexly cause trigeminal neuralgia, but this is not a reason why the sound teeth should be removed as well as the carious ones. The commencement of dental caries is very important in connexion with facial neuralgia, and early treatment of the carious tooth has prevented many a neuralgia.

Prophylaxis is almost helpless in tuberculous and syphilitic disease of the bones of the skull, and one can only suggest the necessity for the treatment of tuberculosis and syphilis. For tumours at the base of the skull, aneurism of the vessels at the base of the brain, and other brain diseases, there is naturally no prophylaxis.

2. Occipital neuralgia is most frequently a result of taking cold, often after having one's hair cut. Moreover it is particularly apt to set in as the result of chronic nicotine poisoning, as after much cigarette smoking, and its prophylaxis consists in the abstinence from excess of tobacco. Occipital neuralgia is also produced by disease of the cervical vertebrae or cervical spinal cord and membranes. Prevention is here naturally a difficult matter unless the process is syphilitic; if so, general treatment is required. Slight pains in the neck and trivial deviations of the cervical vertebrae from the normal should be early noted and thoroughly treated. Prophylaxis is powerless against the more serious diseases of the cervical spinal cord, such as tumours and other affections, which may give rise to occipital neuralgia.

3. Neuralgia of the diaphragm is rarely a primary condition, but arises from severe anaemia which requires treatment to prevent the neuralgia. In most cases it is the

result of disease of some organ which is in close relation with the diaphragm—the stomach, the lungs, the liver or the spleen—or is associated with the pericardium, and any real prophylaxis for this kind of neuralgia does not exist.

4. Neuralgia of the nerves of the cervical and brachial plexuses may be prevented by saving the arm from all overstrain at various occupations; for instance smiths, locksmiths, file cutters, turners, tailors and telegraphists. Very careful treatment is needed in all cases of disease of the bones of the arm and hand, in fractures and dislocations, because pressure by displaced bones is often a cause of neuralgia of the arm. In venesection great care must be taken not to injure the trunk of the median nerve, which runs close by the median basilic vein, for injury to it has often caused neuralgia of the median. Lastly, disease in the axilla may be a cause of neuralgia in the arm: enlarged lymphatic glands should be removed and aneurisms of the large vessels treated, should these conditions prove to be the cause. A supernumerary cervical rib may sometimes be the cause of a traumatic neuralgia of the arm or hand, and the possessor of such a curiosity would probably do well to have it removed for the sake of preventing neuralgia and paralysis.

5. For the prevention of intercostal neuralgia we can do but little. Often it arises from severe anaemia; if so this requires treatment. But generally it is a symptom of internal disease: of the pleura, heart or lungs, or it may be an early symptom of tuberculous or syphilitic processes in the ribs, or may be caused by spinal affections. Prophylaxis can do little in these cases.

Among the neuralgias in the lower extremity we shall only mention neuralgia of the anterior crural and sciatic nerves.

6. Neuralgia of the anterior crural nerve may be prevented by careful treatment of a hernia, by removal of enlarged lymphatic glands, and careful treatment of dislocations of the head of the femur. It may be caused by overstrain in trades, especially in turners and workers of the treadle sewing machine, and these points need attention. Lastly, it is present sometimes in diabetes, and its prophy-

laxis then is identical with that for the treatment of the diabetes.

7. Neuralgia of the sciatic is produced by an extraordinarily large number of causes, against some of which there is no effectual prophylaxis. Those cases are especially hopeless which are caused by serious disease of the pelvic organs, such as tumour, bony new growth and disease of the vertebral column. Prevention is somewhat more practicable in those forms which arise from gout and diabetes, and it may be prevented by suitable treatment of the original trouble. Sciatica which is caused by poisoning, for example by alcohol, lead, arsenic, carbon-bisulphide, may be prevented by the application of hygienic measures in trades and by treatment of the alcoholism. Those caused by cold can be prevented by care: we must warn patients against lying down or sleeping upon the damp ground or in damp houses, and against defaecation out of doors in bad weather, which is often a cause of severe sciatica. Traumatic forms may be prevented by avoiding excessive movements of the legs, particularly violent movements such as are often made when pulling boots on or off. The occupation in life may be concerned in the aetiology of sciatica in those people who are obliged to work much with their legs. Prevention of sciatica is most effectual when it is caused by constipation. The famous surgeon who said he would cure every sciatica by castor oil was hardly correct in making so general a statement, yet it is certain that sciatica can often be prevented by avoiding constipation. Lastly, we must draw attention to the intimate connexion between rectal affections and sciatica. Haemorrhoids often cause sciatica reflexly, and for this reason should be early and thoroughly removed. Moreover obstruction in the pelvic circulation, more especially in those of sedentary habits, may readily cause sciatica; this point also requires careful attention in this connexion. The prophylaxis of sciatica is thus not impossible for all cases.

D. THE PREVENTION OF FUNCTIONAL NEUROSES

1. *Neurasthenia*

The prophylaxis of neurasthenia coincides largely with the general prophylaxis of nervous diseases, as already stated in the first part. To prevent neurasthenia, we must guard against all injurious conditions which will make an individual neurotic whose nerves are still sound. This can only be accomplished by attention to his bringing up, his occupation, and all other conditions of life, and by the avoidance of every form of excess—points which have been already detailed.

A few points which are especially important for the prevention of neurasthenia will now be further discussed. To keep men from everything which tends to make them neurasthenic is quite impossible. There is no doubt that neurasthenia develops in our modern life in a way which formerly was impossible to conceive. But without this increase in neurasthenia we should probably not possess the thousands of improvements in our civilization by means of which we are able to procure advantageous conditions which we are then able to use to strengthen our nervous system. By hard work in very various branches of knowledge and science many men have doubtless become neurasthenic, but they and many others enjoy many advantages from the progress thus made. This advance of knowledge makes life easier, reduces the hardness of work and thereby directly tends to prevent nervous conditions. We should never forget this when one speaks of our "excessively nervous age," and compares it with the former quiet times. Look but at the highly developed state of our communications today. Certainly the electric trams which rush through our streets all day long and half through the night do not tend to calm the nervous system, and may by their constant movement and noise directly injure it, but on the other hand how greatly they facilitate travelling and make it possible for every workman to rest after severe physical work, and ride home for a few pence and thus be saved additional physical exertion when his work is done. Are

we then to get rid of electric trams to prevent neurasthenia? Certainly not. The same considerations are applicable to the telephone, that modern means of communication which is largely blamed for our neurasthenic conditions. How much easier and less trying have business communications become, and though perhaps it injures the nervous system by its unavoidable importunity yet it does very much more to spare the nerves and the strength. Many other similar examples might be adduced. I merely wished to show that there are certain sources of neurasthenia in our modern life which simply cannot be avoided.

The prevention of neurasthenia must therefore be sought in other ways. A careful bringing up of children may do very much. A few details about this have already been given. Here I would again point to the importance of teaching children early to be self controlled, to make them so far as possible insusceptible to external unpleasant and painful impressions, and constantly to keep before their minds the duty of being master of their own nerves. One should not constantly put before them pictures and scenes which will excite them. Much harm is done in this way, especially by letting the children see quarrelling between parents; the parents should set an example in self control. Strümpell truly says: children should never be allowed to hear the words "nerves" and "nervous." It is quite wrong, and will not prevent neurasthenia, if all the child's naughtinesses are slurred over with the excuse: "He is such a very nervous child."

To prevent neurasthenia, the measures earlier sketched out for childhood should be adopted: the body should be hardened by the use of cold water, alcohol should be strictly avoided, appropriate bodily exercise should alternate with mental exertion, sufficient sleep should be had, and all exciting amusements which are not suitable for children should be avoided; and other points already mentioned should receive attention.

The prevention of neurasthenia during the years of development is most important. So far as the body is concerned, great care must be taken to prevent masturba-

tion, and the thoughts should be diverted from sexual subjects.

In girls the hygiene of menstruation, especially at its commencement, requires attention. Many errors are committed in this matter, and the seeds of severe later nervous disease sown.

In later life it is more difficult to prevent injurious conditions. Theoretically one can demand that the hours of work be curtailed, and that regular intervals for complete relaxation be taken; but practically one meets with enormous difficulties in this matter. And yet it is a fact which no sensible man will deny that employés and many of the lower officials in the government service are often so severely burdened with work that they are quite unable to get the amount of recreation they need.

Certainly we must not forget that part of the blame belongs to the workers themselves, particularly in large towns with their many temptations. Instead of using his spare time—short as it is—for real recreation, the young man plunges into those nightly amusements which use up both bodily and nervous energy, commits excesses in alcohol, in nicotine, and in venere, and thus paves the way for neurasthenia. And many of our factory girls and saleswomen are not much more sensible. But though we recognize all this folly there is no need for us to be pessimistic.

Finally, we are helpless against those strokes of fate which cause neurasthenia. Anxiety and sorrow are indissolubly linked with our imperfect life; one has more, another fewer, but no man is altogether spared them. Nevertheless we can make the nervous system more capable of resisting the effect of such external impressions by avoiding other causes which injure the nervous system.

A few special causes of neurasthenia still need to be mentioned.

Firstly, it is important to avoid mental over exertion. I do not mean the regular mental work necessitated by one's work, though that work may be difficult—this by itself never makes a person nervous; but I mean the anxious work often done at night and associated with conditions of

excitement as to the result, as in examinations or prize essays. This is true of every calling: the speculator on the Stock Exchange and the diplomatist may become nervous through such foolish, forced, mental overstrain, just as does the ambitious scholar who is over anxious to make progress. It is the ambition which is the dangerous element. A man without ambition will never accomplish anything in life; but a man should never become a slave to ambition.

People who do much hard mental work must see that they do not overwork. Adequate bodily exercise is needed as a counterpoise; there must be intervals of rest from the work, during which the mind is allowed to rest entirely, or to recuperate itself through some easy work of another kind: fiction and poetry, theatres and concerts, are very useful for this purpose. One part of the brain must not be used to the exclusion of the rest. I have already several times spoken of the overwork of youths at school as a source of neurasthenia. There should be sufficient sleep: people who do much mental work need much more sleep than those who do hard physical work. If there is a desire for sleep after dinner it should be yielded to: one can best judge whether it has been good by one's feelings after such a sleep; but the afternoon sleep should never be long.

Neurasthenia may also develop as a consequence of general conditions of the body, especially after infective diseases and conditions of great bodily exhaustion left by severe anaemia, haemorrhage and prolonged wasting disease. An energetic and appropriate treatment of the primary trouble will do much to prevent an outbreak of neurasthenia later.

Lastly, we must emphasize the importance of excesses in the causation of neurasthenia. An excess of the pleasures which in moderation are inseparable from our civilization and whole mode of life, is often a source of neurasthenic conditions, and it is the duty of education to put a moral limit before educated men, which says: "thus far, but no farther." Unfortunately it is often the educated classes who set the worst example in the matter, and when we speak with a certain pharisaical contempt about the work-

man who has injured his nerves by spirit drinking, we must not forget the injuries to the nervous system brought about in the higher classes by champagne and gambling.

2. *Hysteria*

The prophylaxis of hysteria coincides with the prophylaxis for neurasthenia, and consists above all in guarding the child's nervous system from nervous disturbances by a correct up-bringing. It is so very important that children should be well watched in this respect, because there is no doubt that in hysteria hereditary taint is a far greater factor than in neurasthenia, and there is every reason why we should keep injurious conditions away from the child who is thus predisposed. We cannot enter into further details here, but must refer the reader to what has been said above.

One special form of hysteria, the so-called traumatic neurosis, requires special mention. How far is it possible to speak of prophylaxis in this?

The prevention of accidents is, as has so often been said, impossible. Against these prophylaxis can do nothing. But can it prevent traumatic neuroses?

Several factors are always combined in the production of traumatic neuroses. Generally there is a predisposition out of which the neurosis develops as a result of the accident; this predisposition may be a marked nervous hereditary taint, chronic alcoholism, or arteriosclerosis. These are conditions which cannot be altered; the chronic alcoholism alone may be stopped, though generally we have no opportunity of doing this before the accident has occurred. But in addition to these there is another very powerful factor, the pecuniary compensation. If there were no laws about accidents there would be no traumatic neurosis. The best prevention of traumatic neurosis would then be the removal of these laws from the statute book. That is obviously Utopian, but when we remember the great benefits which have accrued to thousands through these laws, the fact of traumatic neurosis is but a slight disadvantage though often a great difficulty to the doctor. And yet in certain ways

it is possible to influence traumatic neuroses prophylactically. One way is to fix a proper definite amount of compensation. In this the physician is much concerned. He must understand the peculiarities of these patients—and they form a class by themselves—and he must learn to estimate at their true value the complaints made by the patient, whose symptoms are mostly purely subjective. In this respect many mistakes are made by doctors. Let us assume it was an accident to the head without any external wound, without any sign of organic cerebral lesion: the patient has purely subjective sensations, headache, vertigo, lassitude, palpitation of the heart, in short a number of neurasthenic and hysterical troubles. After three months he is examined by the physician, and upon the result the compensation is fixed by the company. The physician gives it as his opinion that there is nothing objectively wrong, that the patient is therefore well, and the complaints are only imaginary and simulated. The result is the company decline to give compensation because no ill effects have followed the accident.

Now mental excitement is added to the condition above described: "I met with an accident, I have a right to compensation, but they refuse to give it to me." From that moment the man regards the company, the doctor and all the State as his enemies, and as Strümpell rightly puts it, covetousness is awakened. This covetousness leads to the well known hysterical, hypochondriacal ideas which refer every bodily sensation of discomfort to organic changes, and which refer all bodily deviations from the normal to the accident, though they existed long before the accident but were unnoticed. This may to a certain degree be prevented, if the patient is examined by a physician who understands such cases, and if he first receives adequate compensation which can always later be gradually diminished in amount. Experience shows that many patients are made perfectly content in this way, and have in the end become thoroughly fit for work again. The effect which the sudden withdrawal or reduction of the amount of compensation by the company, without previous medical

opinion, may have in the production of a traumatic neurosis must not here be discussed, because we have only to do with the medical aspect of the question.

I do not of course mean to imply that every case of traumatic neurosis arises in the way just sketched, and that it could be avoided in the way described. I wished only to point to one way in which it may arise, and in which it might possibly be prevented. The greatest number of cases of traumatic neuroses are caused by an accident in a constitution prepared for neurosis, and may lead to a want of energy and of confidence in one's own ability even though adequate or even full compensation has been allowed. We are powerless to prevent these cases.

The question arises whether by very careful treatment after the accident it would be possible to prevent the outbreak of a traumatic neurosis. This applies especially to cases of accident to the head. Statistics unfortunately give us no information about this, and we do not know whether in cases of severe traumatic neurosis the patient was adequately treated at the time of the accident or not, nor whether the patient commenced to work again too soon, and so on. In cases of head injury it is particularly desirable that the patient be thoroughly well treated, both bodily and mentally, and this is possible only in institutions. Perhaps many germs of traumatic neurosis might in this way be removed, and it were much to be desired that companies would be responsible for the treatment of these cases from the beginning.

3. *Epilepsy*

The prevention of genuine epilepsy, that is of those forms which begin in youth, is not possible. In general we can only say that where there is epilepsy in the parents and where there is a general neuropathic disposition, all measures should be vigorously pursued which make a healthy nervous system, in order that the epilepsy may if possible be prevented from developing. Prophylaxis can do somewhat more in so-called reflex epilepsy. Special attention must be devoted to any scar, especially about the

head, and these should in some cases be excised before any attack has appeared. Such reflex epilepsy may also be caused by a number of other diseases—affections of the organs of sense, of visceral organs and by worms; and the treatment of all these disorders is in a certain sense the prevention of epilepsy.

If epilepsy is already present prophylaxis can do much to prevent an attack, by the avoidance of all alcohol and of bodily and mental over exertion, and by moderation in everything.

That there is an epilepsy which develops as the result of chronic alcoholism is beyond doubt. Its prevention must lie in combating this abuse of alcohol. Similarly the prevention of forms of epilepsy which are the expression of a cerebral syphilis belongs to the treatment of syphilis. Forms of epilepsy which follow acute infective diseases, scarlet fever or typhoid fever, cannot be prevented.

4. *Migraine*

The aetiology of this disease is still obscure, and prevention is therefore very difficult. The disorder is markedly hereditary and develops in an inherited nervous disposition. Here too everything must be done to combat this tendency. There is probably some connexion between migraine and affections of other organs; but this is obscure. Certain nasal affections are said to be concerned in it, and it is probably wise to treat these in order to try to prevent an attack of migraine. Many women and girls who are otherwise perfectly healthy suffer from migraine regularly at the menstrual periods, particularly when they have been unable to take physical rest during this time; and this suggests the way in which prophylaxis may be sought. For the rest, prevention of the attacks seems mostly a question of individuality. The patient generally knows quite well what is likely to bring on an attack, and can prevent the attack by avoiding this cause. In some cases it is a cigar or one glass of beer more than usual, in others night work or a badly ventilated room. This can only be

learnt by the doctor from observations by the patient himself.

5. *Chorea*

The prevention of chorea is conceivable in those cases which are associated with acute articular rheumatism and are probably caused by the same virus. Theoretically thorough early treatment of primary rheumatic disease might possibly prevent the later development of chorea; but there is no statistical proof of this.

Cases which mostly appear at puberty and develop out of some general nervous predisposition should be treated by the measures appropriate for nervous individuals. My impression is that these cases mostly appear in children who have grown fast and have shown great ambition and industry at school. This rapid growth of the body and inadequate care of the mind, indeed often over exertion of the mind, are conditions which added to a nervous predisposition probably explain the development of chorea. These children need the greatest care, in accordance with the principles of hygiene already given. We are powerless to prevent those forms of chorea which are caused by some sudden fright or great mental excitement; all we can say is that the nervous system should be brought into such a condition by hygienic measures that it will be unharmed by these sudden occurrences which cannot be prevented. Prophylaxis is of course perfectly powerless to prevent those forms of chorea which are caused by organic brain disease, such as posthemiplegic chorea.

6. *Athetosis and Paralysis Agitans*

For athetosis and paralysis agitans there is no prophylaxis.

Prevention of Mental Disease

BY

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OF EMMENDINGEN

Prevention of Mental Disease

In order that this subject of the Prophylaxis of Mental Disease may be treated with the completeness which its importance justifies, we need to take a somewhat wider view than the exact meaning of the words would seem to warrant. We must not confine ourselves to a mere statement of the treatment which a specialist carries out in an institution specially adapted for the purpose; but we must first of all speak about the care of the mentally sound patient and consider that aspect of the question which confronts us before there is any need for interference on account of mental incapacity. The chief stress will be laid upon the word "prophylaxis" which includes both the preservation of health and the prevention of disease from becoming worse when disease already exists. But the former, the preservation of mental health, should always be our main object, and all should co-operate with us, whether in their capacity as members of the family or in some official position. Most patients who suffer from mental disease have acquired the disease; they were previously mentally sound though possibly with some predisposition to mental disease. This predisposition is extremely common though often latent, and no one can be quite sure in any given case that he has not to do with an incipient mental disturbance which his treatment may aggravate and develop further or may influence for good. Without wishing to overrate the importance of mental processes in the prophylaxis and treatment as well as in the development of mental disturbance, we must nevertheless take them very earnestly into consideration. In many cases we know that the mental disease begins to develop to some extent in a logical or at least a psychological manner, and that in the commencement the possi-

bility of and desire for cure appear, and that the mental failure is often connected with some external cause possibly brought about by others—all this is well known. One thing more: in a patient not yet mentally affected there are still at our disposal his personal consciousness, his normal sense, his normal power of association which is called up by his sensations and ideas; these are still undisturbed by any workings of his mind, which are more or less unreliable, are still unclouded by the shadows which may later govern all his thoughts and the form, extent and depth of his thinking; and we can still appeal to his memory and to his real judgment. At this time there is undeniably at least the possibility of good results being obtained by influences which are quite impracticable when the patient has become mentally ill. One cannot play upon a broken violin.

This prophylactic treatment of a mind which is still sound, can only be beneficial if the treatment is judicious and kind, if it is restricted within wise limits and not entered upon indiscreetly. The treatment should be in the hands of a doctor: in our opinion the "family doctor," who is best acquainted with the details of the patient's life. In addition to this special knowledge of the patient which we may assume he acquires increasingly from year to year, the family doctor has also a knowledge of the personality of the patient in the widest sense, and this is, if he understands his work, the most important condition for mental prophylactic treatment to be effectual. As the public learn more and more that many cases of mental disturbance cannot be cured by doing this or that, but rather by avoiding some definite thing which is the cause of the mental disturbance, they will more and more value this prophylactic treatment by an experienced physician and will necessarily turn to the family doctor.

It would be a national boon and a far-reaching prophylactic if we could more often again see the family physician in the old sense of the term, as the good and wise friend of the family—of course he would need to possess a knowledge of mental physiology and be able to apply it. This would

enable him also to guide aright and to moderate the zeal of those who come within his influence and are apt to fall into immoderation and over zeal, and he would be saved from the danger of overrating psychical causes of mental disturbance to the neglect of more important physical organic causes, and of falling into speculative illusions and trying psychologically to unravel processes which call for the helping hand of the skilled pathologist.

It is evident that mental prophylaxis in healthy people embraces a wide field and that an exhaustive account of it would be an encyclopaedia of the entire subject of the conditions of life and the relations of our being; the duties of the State would have to be discussed, questions of political economy, hygiene, social politics and religion would have to be gone into; indeed no chapter of pathology and therapeutics could be omitted owing to the inseparable connexion between body and mind. Such a presentation of our subject is impossible from want of space, neither is it at all necessary. It suffices if we bear in mind the close connexion between all the factors which influence our life and their influence upon the general condition of the individual, in order that we may maintain that attitude of watchful care which is the duty of the family physician, and if we constantly remember that the goal can only be reached through the co-operation of those who follow other callings in life.

In the following pages we shall consider those aspects which come to the front in the development of the individual, and we shall follow the natural course and begin at the beginning. We therefore first consider

General Mental Prophylaxis in the Healthy

From the nature of the subject, it will be impossible for us here altogether to avoid the mention of some things which really belong to special parts of the subject. It is impossible to lay the foundation for healthy mental life and to protect it unless we also know the morbid state, and we are compelled to look at both sides by reason of the large and important group of degenerates who re-

present the bridge between mental soundness and disease, and comprise a large section of cases of mental disturbance, and among whom some forms of mental disease are exclusively found.

Prophylaxis in Marriage

The results of mental prophylaxis are the better the earlier the prophylactic measures are adopted in any given case and the more comprehensive they are. The physical nature of the newborn infant represents an epitome of the physical nature of its parents, and if our prophylaxis is to affect the yet unborn child, we shall have to begin with the parents. The most important point here is an appropriate selection. This important matter, whose value for the future race can scarcely be over estimated, is generally disregarded to a dangerous extent. The public as a rule see the importance of getting a medical opinion only in those cases where there is already advanced disease in one of the two people concerned, or where it is known to exist in the nearest members of the family. In the majority of cases the fate first of the two people concerned and afterwards of a whole generation is made to depend upon purely material considerations, property and other utilitarian questions, or upon the voice of affection. The former method is generally blamed, the latter is praised. But both are wrong. Material considerations and financial selection have doubtless certain advantages which should not be valued too lightly: they shield us from many causes of mental disturbance which are most dangerous and a source of very serious mental harm. We need merely call to mind those disastrous emotions, anxiety and domestic sorrow. On the other hand, to follow one's heart is in reality only to let one's affections decide the matter and is equally selfish. The decision concerns children yet unborn, at least as much as the two who desire to marry, and therefore the interests of the children should be considered on altruistic grounds and all reasons for and against should be seriously and thoroughly weighed. In truth many a "commonsense marriage" deserves its name because it was undeniably the

more sensible. Certainly in some cases the physical and psychical inclinations coincide with that which is biologically fittest, especially in those thoroughly healthy people who can safely do whatever is agreeable to them. But among that class of people who may still be considered healthy, the so-called degenerates, most hazardous mistakes are made with very mischievous consequences. And thus—not to mention the saying which we endeavour to follow: thou shalt not only multiply but improve—the standard of the race is often lowered, and the final result is to burden posterity still more heavily instead of lightening it. It is undoubtedly necessary that the aspect of the subject here presented should be more generally considered, and that a deeper sense of responsibility about these questions should be felt. This is mainly a question of education, and much of this will have to be done by the doctor whose work it is to prevent disease. Persons who are mentally unsound, neurasthenic, epileptic, hysterical, of peculiar character, passionate, melancholy, or drunkards, or persons who suffer from neuroses, disorders of metabolism, diabetes, leucaemia, or exophthalmic goitre, may transmit to their children some defect; those also in whose family history such disturbances have occurred, or those with tendency to apoplexy or suicide, or those belonging to families in which some are well endowed while others are decidedly inferior mentally, weak in intellect or with criminal tendencies—all such persons may convey to their offspring a defect in the sense of degeneracy. The degree of the degeneracy depends entirely upon the way in which it is brought about, that is upon the degree of defect in the parents. Marriage should not be entered upon by two, both of whom show serious defects; such defects are intensified when handed down to their offspring and are especially serious when similar pathological conditions are present in the parents, as for instance in blood relations. The prognosis is made worse when there is a great difference in age between husband and wife. Important prognostic hints are not seldom given in the similarity in temperament, intellectual gifts and external appearance with one or other of their ancestors, because

the ultimate psychical fate is surprisingly apt to be similar to that ancestor's. When the physician is thoroughly acquainted with every detail of the health of the parents, he is able to indicate the best way in which the future child shall be dealt with, fed and brought up.

There are slighter cases of degeneracy which demand careful watching and which may seem to become serious at puberty but which, if this critical period has not caused any well marked mental disease, improve remarkably rapidly, so that not only do all symptoms disappear but a kind of cure, if one may so express it, sets in. Possibly in speaking of such a man, the people use the popular German proverb about the Swabian who grows wise in his old age. It shows that in these cases marriage should be delayed, both because the dangers of over hasty attachments may be reduced or avoided and the prognosis for the future offspring will be considerably improved. We need not advise such a patient against marriage but only against early marriage. From reasons of prudence it is wisest to recommend this course rather than reply with a firm negative, and there is great scope for individual skill and tact in getting this delay. When the physician's efforts prove futile, partly because of the thoughtlessness of people, partly because these slight cases are so common, he has to accept the fact of a marriage which is not free from objections, and his duty now is to make the prospects as little unfavourable as is possible for the coming children. The degeneracy is mostly firmly implanted by collective past generations, but may also appear as the result of causes which arise afresh in procreation or which appear during intra-uterine life or even from later illness.

From time immemorial endeavours have been made to secure the best conditions for parents at the time of procreation: it is a part of the teaching of many religions and yet is often unjustifiably neglected. The more persistently therefore must the physician again and again counsel and warn. It is in itself unphysiological that an act which should be the expression of the highest healthiest feeling of energy should degenerate into an habitual function, often reluctantly

exercised, or into an outlet of some toxic stimulation; and above all it is dangerous for posterity, especially for those who, even apart from this, will have inherited a tendency to degeneracy and will therefore be less capable of offering resistance. It may be stated that, *ceteris paribus*, the accidental hereditary taint implanted by conception occurring during intoxication, is still more serious for the embryo of the degenerate than for the embryo of healthy parents. It has been shown that even a very small quantity of alcohol will unfavourably influence the psychical and physical organism, and the bad influence has been observed to act the more quickly and to be the more serious when there are already signs of degeneracy. It is the duty of the physician to teach that the parents should abstain from alcohol for a sufficient length of time before the act of procreation. What has been said about alcoholics applies even more emphatically to takers of morphine, for this poison takes even firmer hold of the cells of the organism than alcohol and causes more marked changes of the entire being. The breaking of the habit or recovery from the habit alone makes procreation justifiable.

We know of cases where the children born to a father after he had been cured of morphinism were healthy and strong and remained so, while the brothers and sisters born while this morphine habit was upon the father, though bearing family resemblances to the other children, yet showed signs of degeneracy, such as pallor, sickliness, nervousness, a neuropathic aspect, and chorea. The same remarks apply to all other similar habits of taking poisons, especially to the still more dangerous cocaine. Although tobacco and more particularly tea and coffee are comparatively harmless, we should nevertheless remember that all these substances may cause excessive stimulation in individuals with an hereditary taint.

Hereditary syphilis is one of the chief causes of idiocy or imbecility and of early paralysis, and especially of the paralyses of youth and also of epilepsy. In considering their prophylaxis, it must be remembered that the risk of infection being transmitted from the parents to the embryo is

the less the more energetic the anti-syphilitic treatment of the parents has been, and the longer the interval after the infectious stage, that is after the appearance of secondary symptoms. Specialists say that three years at the very least should elapse after infection before consent to marriage should be given. It must be pointed out that the opinion formerly held is erroneous, namely that a healthy embryo does not become infected if the mother becomes infected while pregnant.

For epileptic parents total abstinence from alcohol should be strictly enforced, for it can be shown that alcohol even in small quantities seriously affects epileptics; it is indeed a poison which tends to produce epilepsy both in the drinker of it and in his offspring. Patients suffering from severe forms of epilepsy, with loss of consciousness, are unfit to have children. In the event of conception occurring, bromides often act well as a specific and do not injure the embryo. Flechsig's opium and bromide treatment is exhausting, and should only be used when the patient's whole time can be given up to the treatment.

It is known too that every general disease from which one of the parents may be suffering is unfavourable so far as the bodily development of the child is concerned. The effect of such diseases in the parent upon the psychical constitution of the child is less evident. Patients in advanced stages of phthisis may produce astonishingly healthy children, although in some cases the child is feeble. Descent from tuberculous parents seems to give perceptible psychical vulnerability which does not necessarily stand in any direct relation with any evident pathological and anatomical condition. Scrofula should also be borne in mind because of its mixed nature. It should also be mentioned that a phthisical woman often bears pregnancy extremely well, but afterwards, though not necessarily through the effects of lactation, rapidly declines. Chlorosis, or at least the predisposition to it, is hereditary, and marriage should be postponed or at any rate conception avoided till the chlorosis is cured. Often the birth of the child influences the case for good, and this may in part be ascribed

to stimulation of the organism by loss of blood and is a further proof that in some cases venesection should not be despised. It is most essential that a sufficiently long interval for recuperation should elapse between successive pregnancies, both for the sake of the mother and of her offspring, yet this is often disregarded. Evidence of former rickets should be looked for and inquired after, because rickets is often hereditary and influences the development of the brain and therefore of the mind. It may arise during foetal life, and may be a symptom of hereditary syphilis, but the main cause is improper nourishment of the infant. When there is a tendency to rickets, appropriate treatment of and a suitable diet for the pregnant woman may prevent much of the harm.

Malaria is not directly transmissible, though the general disturbance which it causes in the parent's constitution affects the embryo. In addition to quinine, which acts as a specific, a change of climate often gives excellent results and should never be neglected or postponed too long.

Finally, psychical hygiene can do much for the future offspring. Affection between the parents and tenderness in speech, a happy disposition, and good physical and psychical health are all favourable for their child. Even the choice of the time of day for conception may be important, and in doubtful cases can best be determined by the physician who has physiological knowledge and is acquainted with the case. The period following some physical ailment is unsuitable, lest the patient has not yet quite recovered from the disease; so also is the period during or shortly after some exhausting occupation, serious vexation, passionate emotion, and during or directly after numerous trivial events, such as ill humour, which are so apt to be met with temporarily in those tainted with degeneracy.

Prophylaxis during Pregnancy

Much that has been said about prophylaxis in procreation and which is essential then for both parents, applies also during pregnancy to the mother. If there is any well founded suspicion of syphilis treatment should be prompt and energetic. The foetus tolerates extremely well antisyphilitic remedies, such as mercury. When the exhibition of potassium iodide causes serious disturbance of the mucous membranes, and we are obliged to resort to atropin, we may do so safely without any fear of injuring the foetus. Often the conditions are such as to require the greatest discretion; and it is then best to give the mercury subcutaneously.

Bromides should be administered to a pregnant woman who suffers from epilepsy. It reduces the danger to the child both as to epilepsy and as to mental disease, and at the same time acts as a prophylactic against eclampsia, which is to be feared in the mother and which is also dangerous for the child, because it deprives it of oxygen. For the rest, all injurious influences should be avoided during pregnacy, and especially all sources of irritation which would injure the nervous system. The developing brain is in general more sensitive, and can therefore be more readily injured than can the developed brain of the pregnant woman, and the two are functionally more intimately connected than can be shown by anatomy. Fevers and infectious diseases appear greatly to irritate the embryo; this effect and the frequent abortion brought about thereby may be partly due to toxic products. Among non-bacteriological poisons, the effect of alcohol is especially bad, and the same is true of morphine; alcohol affects the future child by injuring the bio-chemical conditions, but well marked morphinism has been observed in infants.

Much will be gained for the future welfare of the child if it is possible, during the period of pregnancy, to ensure a calm harmonious disposition in the mother, and to guard her from injurious and excessive anxiety and care. The

morbid cravings of pregnancy may appear in degenerates as importunate uncontrollable ideas, and it is best to give way to them as far as possible instead of arousing irritation by attempting to suppress the craving, for the possibility of this is after all doubtful. Great importance is to be attached to the surroundings of the pregnant woman. It is undeniable that the tales of old women exercise a bad influence upon the mind of the pregnant woman, and may be the ultimate cause of a mental breakdown which will directly or indirectly affect the foetus, and the tendency, especially among primiparae, of allowing the mind to dwell constantly upon the expected event should be combated.

Prophylaxis during Delivery

During delivery gynaecological and obstetric measures are naturally the more important; still we should also endeavour to avoid everything which would upset the mind of the patient, and special as well as general precautions are required. A very long labour and great compression of the foetal skull are apt to injure the child's brain, and the physician should be prepared to prevent this. Without going into further detail we may state that in such cases the induction of premature labour may be indicated as a prophylactic for the sake of the child's mental condition. The obstetric difficulties referred to above are generally the result of former rickets affecting the mother's pelvis, and this is hereditary and often combined with little power of resistance of the brain, so that there is a double need of caution. It should also be noted that mothers who are not rickety but who are either very young or over thirty years of age have often difficult labours. The use of forceps offers the quickest method of ending labour, but has the disadvantage of compressing the child's skull, so that for the cases we are now considering extraction after version or Caesarian section is preferable. When syphilitic affections of the maternal genitals are present, the child may become infected during birth, if it is not already affected, and this should be remembered in order that necessary precautions

may be taken. Women who are in labour and are epileptic or have a mental taint or a tendency to eclampsia require the closest watching and should be under the constant care of the physician. An eclamptic fit is an indication to terminate the labour. Caution is needed in the use of chloroform as the poison is carried to the infant which is still attached, and it has been known to injure the child. If the child is born in a condition of asphyxia, it should be remembered that very drastic measures employed in attempts to restore respiration are not altogether harmless for the delicate nervous system of the child.

Precipitate birth may predispose to mental disease which may only become apparent some years later.

Prophylaxis in the New-born Infant

The infant must be shielded from a number of dangers which experience has shown threaten the first period of life. It may be rickets for which medical aid is sought. Hydrocephalus, which often appears with the rickets, is a serious condition, but there is the possibility of spontaneous cure, and when this occurs the increased space which has thereby been provided for the developing brain in the enlarged skull is not undesirable. The best treatment of rickets is not by drugs but by good food, fresh air, light, warmth, absence of damp and the avoidance of infantile diarrhoea. The mother's milk is the best food for the first six months, but when there is already an hereditary taint in the mother, it may be best, in the interest of both mother and child, to get a wet nurse who is mentally strong.

Congenital syphilis is the cause of the most serious forms of mental diseases and requires most careful treatment. The undeveloped brain, especially of rachitic children, shows a tendency to respond to peripheral sources of irritation by epileptiform convulsions: cold, improper diet, errors of the nursing mother, and later, worms and teething are the principal exciting causes. These infantile convulsions may be the initial stage of true epilepsy, or they may cease when the original source of irritation is removed; in the

latter case they may be regarded as reflex convulsions. But they are never physiological, and point to a certain weakness of the brain structure which the physician should note in considering the future of the child.

Prophylaxis in Childhood

Of secondary yet of sufficient interest to us are the infantile diseases in the narrower sense of the term: they are measles, scarlet fever, German measles, chicken pox, diphtheria, whooping cough and infantile paralysis.

Febrile delirium often appears during the course of these diseases, especially in degenerates, and should be regarded partly as the effect of toxic products, partly as a sign of exhaustion; in this respect it resembles infantile convulsions. This febrile delirium of childhood is not necessarily serious nor will it leave serious after-effects, but it serves as a danger signal, and the same is true of those temporary hallucinations, mostly visual, which appear not seldom in excitable children after strained mental effort, especially in the evening, and may be accompanied by a slight rise of temperature, though this increased temperature is quite insufficient to explain them. In scarlet fever we must bear in mind the danger of middle ear disease and of brain trouble.

Acute anterior poliomyelitis is of very serious prognosis; it may appear in the course of the infantile diseases named above. This and the somewhat similar cerebral infantile paralysis are a proof of the small amount of resistance possessed by the nervous system of a child. Both diseases show there is a tendency to epilepsy, though this may not appear till many years have elapsed. Paralysis following diphtheria is generally but not always of peripheral origin, and the prognosis is more favourable. Permanent motor disturbances are serious, psychically considered. Apart from the mere mechanical and psychical results of such peripheral irritation, a weak arm or a club foot must at least to some extent isolate the cripple from others, and this isolation will leave its traces even upon the

healthiest mind. A large number of cases of chronic spinal disease are hereditary and associated with psychical symptoms.

We must point out here that many drugs produce secondary after effects to which we shall later refer; idiosyncrasies in this respect are found even in children.

Prophylaxis during Mental Development

So far the prophylactic measures have all been indirect, because indications for them were derived from the general experience of specialists and from adults. We cannot obtain information to guide us by observation of an infant's mental life, for the cerebral functions are at first purely spinal, the sensations and innervations primitive, and there is as yet no mind. But its development begins at once and proceeds in normal cases with surprising rapidity, urged by a real thirst for knowledge of localization, and now the important task of the formation of the mind confronts the physician who has studied mental physiology. Details he will have to leave in the hands of the parents or of those who have the care of the child, but the final decision and supervision rest with him whose knowledge and acquired skill fit him for the task.

The human being at birth is in a condition of perfect helplessness, but even in utero he is capable of the automatic movements needed for sucking. Of the sensations, that of general sensibility first appears; the other senses generally show their presence through reflex acts, but are still undifferentiated. Although differences in the degree of stimulation are early felt, yet they do not pass into perceptions, and the mental process of association which later scarcely ever ceases during our waking life, is altogether absent in the infant. The child feels a stimulus or irritation, and responds to it by movements until the stimulus is removed or changed, whereupon the child makes other movements and thus learns to distinguish between those which are useful and those which are useless. These ideas

—at first quite primitive, since everything is new to the infant and only acts by stimulation—are the foundations for the associative process, for conceptions and for the process of the comparison of latent mental images (memory pictures). This shows how great is the danger that children who have not all the senses or who have not a perfect power of movement will remain mentally undeveloped. The further course of development is that more and more experiences are gathered, that more ideas are garnered and worked up by the process of association, that is by thought; selection by attention appears; a better and better arrangement of the materials for association becomes possible, indeed becomes a necessity; the consciousness of personality is evolved, and the organ of all these activities, the cortex of the brain, begins more and more to direct these. Next a number of subordinate functions appear, all under the supreme control of the brain, and later, when these are sufficiently practised after long habit to act as automatic centres, the organ of association is relieved by these automatic centres of activities which were originally purely cortical ones. The original close relation between stimulus and motor response becomes ever less and less intimate; emotions which appeared first as reflexes become more and more restrained by the increasingly developing mental processes—memory, perception, and judgment—and again those mental impressions which are really related are grouped together so that any overburdening is prevented, and thus our consciousness is not limited. In a certain sense it is therefore true that the main work of the cerebrum is control or inhibition.

Many of these activities are carried on as if by instinct along paths which seem ready for them, the anatomical conformation for which is doubtless inherited, and therefore special individual characteristics appear early which are full of meaning as regards prognosis and valuable as regards prophylaxis. For the deeper insight into the child's mind which is so full of fascination for the psychologist, a more advanced stage of development is essential, and a certain capability of expressing itself by language; in this respect

individual children show great differences both in kind and in degree, and this again is of prognostic significance. Extremes are met with among degenerates, and we must consider these more definitely. In these over sensitiveness or lack of sensitiveness early appears in many faculties; they have lack of balance, abnormal mental ability, pecular likings and aversions, and a high degree of suggestibility—these are qualities each one of which conceals within it the germ of a psychosis. We meet with similar conditions in the healthy; and for this very reason those entrusted with the care of the child cannot too carefully watch its psychical life and mental development, and observe all its peculiarities and idiosyncrasies for future guidance. Such study gives us valuable information about what has been termed the "psychical formula"; we should observe the special mental way in which experiences are noted, the feeling elicited by certain things, the appreciation of similarities, the association of ideas, the need of recreation and the method of recreation. For example, inattention is in many children only the result of a preference for remembering certain other definite things; in other children the preference for a certain definite line of thought, or the brooding over one thought; in others again it can be ascribed to a faculty for dreaming. Thus in the one case it is a sign of control, of inhibition, of the faculty for perseverance; in the second case also it is in part well founded; in the third case it is uncontrolled imagination, and of different significance as regards psychological cause, prognosis and prophylaxis. In the former cases, especially if the inattention tends to be repeated, our task is to relieve the cortical cells of associations and to restimulate them; while in the third case instanced we must check the tendency to dreaming and make the cells susceptible to the stimulus for logical thinking.

This analytical observation of the child will also give us an insight into the child's primary being; the spontaneous changes in association, by emotions, weariness, exhaustion, follow the easiest paths, the paths of least resistance, which are not always those made by the activity of thought and

may be very peculiar. These tendencies in specific directions, these individual peculiar associative paths, are of great significance, because they reveal a certain weakness and because, in various psychoses, similar habitual paths of association are followed which we must regard as founded upon a primary habit. Equally valuable and useful is it to note the way in which the memory of separate ideas alters in course of time, not so much an alteration in the quickness of memory or degree of memory, but a qualitative change.

We have been able only very briefly to allude to this, and point out the important deduction that observation must be individual and that the physician who is most skilful in making such observations will be best also at prophylaxis. Sympathetic individual treatment is more necessary for children than for others, and should be seriously undertaken. These spontaneous external manifestations, important as they are, yet do not exhaust the subject. We should endeavour early to wake the sense of self observation and the feeling of trust; for the child likes to cling to what is best for it. Confidence wins the child instinctively, and to one it will humbly offer as a gift what to another it resolutely refuses. The latter result may be brought about by obvious endeavours to compel, because children are sharp observers and reasoners. The exploration of the child's mind is an art which is difficult to practise and still more difficult to teach.

We must endeavour evenly and gradually to unfold the mental capacities, carefully guide the emotions, harmoniously adjust the receptive and active sides of the mind, and secure an equal all-round development of the mind by checking the tendency to overgrowth of some of the associative paths and by stimulating others which are being neglected. This is best accomplished by regular practice or habit, which makes it easier for the child and enables it to do more, and this evokes a feeling of pleasure which in its turn makes it still easier and more useful.

There are children who have primarily little power for comparison: the connexion of cause with effect has been

neglected by the mind. The organ of association left to itself becomes in a sense easily limited, not from any lack of ideas but from a confusion of ideas. There is a lack of logically thought out and well arranged mental material, and the capacity for purposeful concentration is reduced or wanting. Early training to correct this atrophic condition of association and constantly to stimulate purposeful thought will, thanks to the wonderful elasticity of the young brain, remove so to say these organic natural defects, so far at least as the function of the brain is concerned. This is true too of the tendency which exists in some children of "jumping to a conclusion," of inference through emotion, of exaggerated ideas connected with things pleasurable or unpleasurable. These are features which may be pathogenetic of paranoia and which have been already alluded to under the signs of degeneracy. To prevent such mental defects self criticism should be early encouraged; distrust should be implanted against the primary subjective pleasurable feelings accompanying these associative digressions and wanderings, and those feelings should be cultivated which accompany logical sequential thought; later this practice will be gladly pursued when an insight into its usefulness has been obtained, and will become a source of strength. Every association leaves its trace, and the previous association will influence the following one and to a certain extent will leave its impress upon it, so that prophylactically it is all important that we shall introduce new associations of ideas which will outweigh the old, and this affords further confirmation of the value of never ceasing effort and of constant watchful self control.

It is most important that these active voluntary mental processes, which may be termed internal activities, and especially attention, should always be accompanied by a feeling of pleasure. The development of attention in individuals is proportional to their intelligence, and it is therefore of the highest importance that the child should feel pleasure and so maintain and strengthen attention. On the other hand attention, like every other voluntary

impulse, is accompanied by a motor tension; and this shows the value of physical exercise, of the strengthening of the body, and of games in order that the will power may be increased and these supreme mental functions carried out. A healthy body is needed for a healthy mind, both in its entirety and in its various parts, and it is therefore an essential in mental prophylaxis.

These statements are called for here because they are of direct practical application in preventive treatment, and the sooner the treatment is commenced the greater will be its influence upon the mind and the whole life of the individual. We must however utter a warning against expecting overmuch from these psychological preventive measures. Nevertheless we may say that the further education of the child and the acquirement of knowledge would be easier and more successful, and that the school would be able more completely to accomplish its object and would give less cause for fault finding if it were possible to deal individually with every child during the entire course of its education and development, according to the outline sketched out above; that is if an educational method of mental prophylaxis were practicable throughout.

But this influence on the mind of the child should be begun very early, long before there is any question of its going to school. It is not necessary that the child should be taught anything at first, but only that some one should be occupied with the child, and it is therefore of the greatest value that when possible the mother who has brought the child into the world should understand what she can do.

The Prophylaxis of Education

1. PROPHYLAXIS IN TEACHING

A certain amount of elementary knowledge and certain elementary principles for the formation of character should already have been laid down before the child enters school. The work of the school is rendered more difficult by the

requirements of the school time table and the quantity which has to be gone through in a given time. This brings with it on the one hand the danger that the time required for the general training of the child is curtailed, and on the other hand there is the danger of over burdening and overstrain, most marked among the less gifted scholars. The division into classes according to the working capacity needs much thought, and it has been rightly said that this dividing up of the instruction given maintains the idea of the school as an organic whole and is of educational value. To prevent every injury from education is not possible, if we are to train up a robust capable race and not an effeminate one which would be unequal to any strain. But we must see to it that the school causes no permanent injury; and the loss of pleasure in work is a very serious loss, because of the limitation which it puts upon mental and physical work. Neurasthenia, hysterical manifestations, rapidly developed chlorosis accompanied by mental change, may be the result of an unhealthy strain in education. Moreover myopia may considerably limit the power of work, and bodily deformities—the important bearing of which upon mental activity has been already pointed out—do not grow less during these years. Headache, sleeplessness, apathy and nervousness are danger signals which should lead the physician to search for the cause without delay. Sometimes the cause is merely physical and easily removed; in other cases the school is partly the cause, not through any overstrain of learning but through an overwhelming dislike. There are scholars who pass through months of harmful emotions, of anxiety and fear—less often the fear of a severe teacher than that occasioned by rough schoolfellows or even by one fellow scholar. The child is often ashamed of being afraid and says nothing, and the discovery is not made till the child breaks down, and a permanent reduction of the power of mental resistance is the result. There are schools in which systematic illtreatment occurs daily, and the victim is generally a degenerate whose bodily or intellectual peculiarities call forth this bullying; that is he is not a healthy child, though not definitely

ill, but one who may be looked upon as psychically handicapped and who requires the most gentle treatment.

It is obvious that these remarks are applicable also to the punishment of children. In the right use of punishments we have a powerful educational ally, a valuable mental prophylactic for the correction of any of those one-sided or excessive associations which have been already mentioned. What was there stated will give many a useful hint to school authorities and we will now add a few special suggestions. In order that this power of perception which we note in the child and which has in it the germ of genius may be fostered, well directed exercise and constant correction by the co-operation of adults are needed, and the scholar's facility for association should be guided by pointing to the connexions which exist between things. Any oversight or thoughtlessness must be very wisely and cautiously alluded to—even a "No" may often discourage a very sensitive child—and it can be best done by kindness and by a gentle allusion to some recent good work done by the child which will arouse again its desire to please. Constant comparison and wise repetition make this associative feeling of affinity more and more reliable as time goes on. Education to develop the power of comparison between objects observed is especially valuable. This associative power of classifying and sorting experiences is a security against the danger of distraction by the vast number of impressions received, and pointing out the ludicrous mistakes made in the hasty conclusions drawn by eager children is a very useful method of checking erroneous perceptions and of making the children recognize and value correct observation. Inattention is regarded as a mental endeavour to prevent overstrain, but it may easily do more harm than good. Moreover it must not be forgotten that the power of attention acquired through education in any given case corresponds directly with the stage of development of the inhibitory power of the brain, upon which the physician is obliged to base his prophylactic measures.

Attention requires that ideas which divert the mind shall

be excluded. These ideas must now be investigated. Often these disturbing ideas are so strong in association because they are not yet complete, not yet answered, because they contain a question. The adult can easily by his riper intellect supply what is wanting, and thus remove the excessive force of that train of thought. Often the child can be freed from this thought if he merely mentions it, and to succeed gradually in getting shy, timid, reserved children to talk is a great and rare gift; sometimes one single word spoken to a child will act with the power of a suggestion for a long time to come.

Observation of the power of work of schoolchildren will also give indications for psychical prophylaxis, and still more so will observations of the variations in the power of work, produced by mental influences, by new impressions, by the effect of work previously done, and by the interest shown in the work and in other things unconnected with the work. At the present time investigations in this direction are being eagerly pursued.

One of the most important prophylactic aims at school should be to keep alive in the child the sense of pleasure in work even though the child be liable to maniacal impulses, unregulated mental processes and overhasty action, provided only that the desire for self correction be equally marked. To be held up as an example, to have ambitions, should be encouraged; indeed one may even make use of certain little weaknesses, antipathies, and vanities, if thereby a higher object is attained which, by virtue of further possibilities which it promises, justifies the use of these means that will be put aside as soon as their work is accomplished. Praise rightly bestowed may be of value; a remitted punishment often accomplishes more than bodily pain. Homilies are mostly useless, and are then apt to lessen authority. So too to attempt to inculcate ideas of good and bad is useless. The child wants to see results, not to hear theories. For one who is developing, the absolute is not suitable. Neither is it of any use for the teacher to get angry. The result of his dealings with any given child should alone guide the teacher in his future course of action.

In every case it is essential to individualize, and nothing is more fatal to our purpose than the stereotyped schemes of education of the present day. It is not the amount of work done which deserves praise, but the amount of pains bestowed upon it. A little work may be far more deserving of praise than some brilliant performance, because it was wrought by one whose capacities were small and needed encouragement, while the gifted child is easily spoiled by praise. Individual acknowledgement of little efforts is also useful in those cases where we desire to arouse pleasure for receiving and learning something which is not agreeable. We can with care induce the child to do small things and thus accustom him to feel at home with them and grow to like them, if we are successful.

Purely mechanical learning by heart should be avoided: it removes the stimulus to valuable mental effort, is useless for the associative process, and therefore of no value in prophylaxis—indeed it may bring with it certain dangers, because it paves the way possibly for certain psychoses, especially catatonia. The teacher who understands his scholars, who is loved and yet feared, will best be able to do this work; indeed he will be unable to overcome certain difficulties if these relations do not exist. His word and example will have the force of suggestion, and will have the surest and quickest effect, because children respond very readily to suggestion. This is true not only of those children who are degenerates, but of every child not yet fully developed. To sum up we may say: school should continue and finish this prophylactic work in its psychological aspect; it establishes a normal tone of feeling; it develops a store of definite internal aids to association, and gives the capacity for logical thought and ideas.

Harmful conditions at school mentioned above, may suggest the thought that private instruction should be substituted for school. This requires very careful consideration, and the constant competition at school is certainly of great advantage, at least for boys. On the contrary, it may be necessary to remove the child altogether from the influences of its parents if these

influences are harmful. Not a few cases of overstrain with its evil consequences are the fault of injudicious ambitious, vain parents, and possibly at the same time very strict; more often, it would seem, the father is at fault than the mother. In other ways too there are many disadvantages in the training of a child by parents who lack judgement and are a prey to their passions: the influence and the example of the parents may be the direct cause of many a morbid tendency.

To arrange the time table of subjects taught according to hygienic principles would doubtless prevent many dangers. The subjects and work which are most exhausting should occupy the first hour of the day and the first days of the week; the afternoon should be free from any compulsory subjects; and there should be intervals between the subjects of increasing length, some days of rest, and short but frequent holidays.

The appointment of school physicians would be very useful. They would require special tact, or even diplomatic skill, and, in addition to all other medical abilities, a knowledge and understanding of the workings of the mind. The school physician will only really deserve the name if he is thoroughly versed in psychology.

2. SEXUAL PROPHYLAXIS

The work of the school is important and cannot be postponed, because while under its control the youth will before long be called upon to face the trying period of puberty.

Puberty generally appears and becomes established earlier in girls than in the male sex, where it is apt not to be fully established till about the age of thirty years. The sexual instinct however may make itself felt very much earlier; we do not mean the instinctive feeling for the opposite sex, but the instinctive response to sensual feelings. In small children, even in infants at the breast, co-ordinate onanistic movements may be observed. Often enough these may have been caused by unconscientious nurses who have used manipulations to quiet the child or

from sensual enjoyment; but they seem also to occur spontaneously, and the ease with which the tendency persists and the difficulty with which the habit is overcome, even after attention has been drawn to it and there is a willingness to obey, probably show that there is an unfavourable predisposition which requires greater attention for prophylaxis, and which often leads to precocious early signs of puberty in children whose genitals have thus been chronically stimulated. We shall again refer to this in speaking about degenerates.

It is extraordinary what a large proportion of the thoughts of almost all children of a certain age is given to sexual questions, chiefly because these thoughts have the attraction of the forbidden, because they are the fashion, and because the scholar who entertains them has the pleasant sensation of an inner independence of the members of the family who are apt to prohibit this subject. As a matter of fact these undesirable topics in children are much more rarely associated with sexual feelings than one is apt to assume. The latter are not generally felt till masturbation is practised, and this, in healthy children, has probably always been taught them by vicious example; in some cases it is wholly unaccompanied by any sexual idea. Both parents and teachers are to blame for the existence of this habit among elder pupils, so that those who might be expected to help in overcoming this bad habit are often incapable of helping.

Masturbation is always injurious, though in varying degree. It is abnormal in little children and becomes pathological after the period of "storm and stress," and when there are possibilities of intercourse between the sexes. In addition to the injury to the body, there is danger in the ever closer associative link between the natural impulse and its unnatural satisfaction. Moreover the feelings of remorse and dislike which constantly follow masturbation are highly injurious. The habit gradually becomes a want and finally is the only expression of the sexual life. There is no doubt that masturbation is a very serious cause of mental disturbance.

As prophylaxis the choice of uncontaminated companions is of the greatest importance. It is well known that bad habits learned at schools are frequently passed on from one generation to another. This is one point in favour of education at home. Every precaution should be taken before deciding to send a child to any institution: every possible inquiry should be made, and the ways of the inmates of the institution in question should be observed, particularly during their free hours. Here again the confidential physician of the family may be of great help. Then too one should watch the friendships which the child makes. If the influence is bad, it may be much wiser under the circumstances for one who understands how to deal with the child to use the opportunity for helping the child rather than adopt the simpler authoritative course of forbidding all social intercourse. For older children early sensible explanations are an important means of prevention. The influence of the parents is far greater than the influence of the school, especially at the age of puberty and in connexion with sexual questions. In any case the children do not remain mentally innocent; the book which we take out of their hands in fear is harmless compared with all that they hourly see at school. Our duty is to keep the child healthy—and we shall not be able to do this either by prudish or cowardly silence or by moral indignation, reproof and punishment.

In masturbation we have to deal with a morbid condition which has arisen in a normal way. Therefore the medical aspect is the only one we are justified in taking in judging and treating this habit. The physician is generally more respected by the school children than either parents or teachers, and for this reason he would seem to be the best able to help in overcoming onanism. Mentally considered the impulse to masturbation must be regarded as a one-sided function, an imperative uncontrollable idea; and the removal of this fixed idea is best brought about by introducing and strengthening other ideas and associations, by physical exercise which engages the mind, by arousing a desire for work which is in itself interesting, and avoiding sedentary

habits and solitary musing. It is much more effectual to build up the healthy mind in this way than to work upon the feeling of disgust which is always present in those who masturbate. The art of replacing the idea by another idea at the moment when the impulse to masturbation is felt is a far more hopeful method than that of relying upon the feelings of remorse which arise after having giving way to the habit. The tactics must be indirect; we can do very little against these excessive associative ideas, but rather we should cure the condition by raising the associative value of healthy ideas, constantly endeavouring to get the active co-operation of the patient. This point of view is important too in relation to hypnotism, and the method of suggestion, though very valuable in itself, must therefore be very carefully used. The details of the mental treatment must be adapted to each individual case.

Among drugs bromides are valuable, for they have a specific effect on the mind by reducing the condition of internal tension associated with these feelings. In allowing normal sexual intercourse for young people one must be extremely cautious because of the danger of infection; but in some cases it may be the lesser of two evils.

It may be mentioned that in doubtful cases it is well always first to think about injury through sexual perversion than at once to diagnose overstrain through education.

It can be shown that the heart suffers when there is excessive sexual intercourse, and affections of the heart are of some significance in the development of mental disease.

3. THE PROPHYLAXIS OF PUBERTY

Even when the age of puberty is kept free from any sexual injury, it may nevertheless be a dangerous period which shatters the mental constitution. The danger is greatest for degenerates, particularly for those with an hereditary taint, though it is bad also for a constitution with lowered vitality. A large number of such persons may suffer from the psychoses of puberty, especially those not protected by prophylaxis. This is the case with illegitimate children and

with children belonging to poor families, and to families not well equipped mentally; with children also of weak character, and those suffering from cardiac disease, chlorosis, anaemia; with young people who have grown very rapidly, or who are predisposed to phthisis; and with alcoholics. The best prophylaxis for this mental disturbance is to cure the diseases mentioned.

For this reason too we should try to put a stop to students' clubs, which are injurious to health because they shorten the night's rest and often lead to alcoholic intoxication.

The earnest attention and care of the physician who pays attention to prophylaxis are required during the time of the final examinations which generally come about the age of puberty. The best prophylaxis is that the instruction and work of the students should be so arranged that any special preparation for the examination is unnecessary; but even then there is the strain of the examination itself and the mental excitement. Here rational prophylactic measures, both domestic and medical, are of much value. They comprise regular meals of digestible food, sufficient rest at night, alternation of bodily and mental exercise, baths, gymnastics and massage. The functional activity of all the organs should be maintained, and a rational general management of the body avoiding all excesses and all over indulgence should be carried out.

Smoking, a favourite habit among students, should be reduced to a minimum; alcohol, which always and permanently reduces the mental capacity and injures the powers of observation should be discarded. Sometimes alcohol gives an inclination for work, but strictly speaking it will not be so well done as it would be done by a brain free from alcohol, though if the alcohol had not been taken the work would have remained wholly undone. Alcohol is not without value in inducing sleep, particularly during depression.

During the time these important examinations are impending, efforts should be made to prevent the associative life from becoming one sided and from revolving always

around the desired result and its dreaded difficulties. These thoughts must not constantly control the consciousness, and measures must be taken to prevent it if need be, and particularly if these thoughts are not free from overpowering emotion, which on the one hand lays firm hold of the associative activity, and on the other hand by paralyzing the attention necessary for other thoughts acts like a foreign body.

In girls puberty, with its many new organic sensations and startling sudden manifestations, exerts a still deeper influence upon the mental equilibrium, and to this are added the nervous changes during and after menstruation. Menstrual disturbances require attention although, in quite healthy individuals, they may be harmless. We take this opportunity to state that bathing is permissible during menstruation, though cold baths are often regarded as the cause of functional ovarian disturbances. Mental excitement during the catamenia is not free from danger, and this should be remembered at the present day when girls' studies have been so much increased.

4. PROPHYLAXIS DURING THE WORKING LIFE AND THE PERIOD OF INVOLUTION

The important step of the choice of a vocation should only be taken after well weighing the personal tendencies and capabilities and considering the medical aspect in regard to mental prophylaxis. The fact that a disposition, a mental weakness, is not necessarily always inherited but may also be acquired, that only a thorough personal knowledge of the person concerned enables us to arrive at an opinion as to what is advisable and what is dangerous, must always be before the mind of the confidential physician. He must understand the future vocation in its various aspects, and the prospects of success, he must estimate the amount of bodily and mental exertion required, and must point out the many differences in the learned professions between professional studies and professional life—in short he must act up to the limit of his ability as an arbiter between certain predilections and the hard realities of life's possibilities.

The student's life and still more the manner in which it

is often lived has many hidden dangers for the mind; this is true about the career of officers, engineers and various branches of mercantile life. Prophylaxis must endeavour to remove whatever is injurious in these vocations. The chief dangers are abuse of alcohol, bad hygienic conditions, and sexual infection—and for the student, injuries to the brain and overstrain at examinations through faulty arrangement of work. The careful selection of a university is of some value, because there are great differences between universities. In some universities excesses in alcohol and in fencing are the custom, and although severe acute anaemia may be often recovered from, yet it may sometimes lead to very serious consequences, even to the brain. For recovery after much dissipation the patient requires plenty of sleep and should abstain from alcohol, and this is the case too at examination times and while preparing for examination. Fencing, as a bodily exercise, must be regarded as one sided, and for the sake of prophylaxis it is much to be desired that the English games and sports could be more widely introduced. The hours of recreation are often more exhausting for students because of the abuse of alcohol than are the hours of study, and great improvements in this respect are needed for the sake of health. The intimate connexion between alcoholism and sexual infection is well known; and gonorrhoea, which formerly was regarded as a trivial disorder, may also engage the attention of the physician for mental disease, since cases of gonococcic meningitis occur.

The woman engaged in professional work is far less exposed to all these dangers, but her smaller power of work and of resistance make her more susceptible to the injurious effects of her calling. The woman's question will probably, as it progresses, set free the woman from certain fetters which have had the effect of preparing the soil for mental disturbances. On the other hand however there will probably be more numerous cases of cumulative inherited tendencies in future generations from the acquired injurious conditions of the parents. The woman has a smaller power for work, and it is especially dangerous if she tries to increase this by stimulants. Degeneration from the action of

alcohol, ether, morphine and cocaine, runs a very rapid and severe course in women.

Married life possesses certain incontestable prophylactic advantages. Longevity is greater among the married than among the unmarried, and the married man is less liable to the danger of mental disease than is the unmarried. But other factors also come in, and the conditions brought by marriage may be much more unfavourable for the woman, so that we must not expect marriage to act as a prophylactic in any individual case unless there are very good reasons for thinking so. The anxieties and excitement which are inseparable from the life of the married woman, pregnancy, childbirth, the puerperium and lactation, the loss of husband or of child, may all of them predispose to mental disturbance and even cause it; so that the question may arise whether in a given case it may not be better to avoid all these risks. The unmarried, on the other hand, miss a number of conditions which give rise to a feeling of security and peace, and are mentally satisfying and therefore prophylactic. The woman misses this organic sexual satisfaction far more than the man, because her sexual needs cannot be satisfied so easily in other ways; this difference is too firmly implanted in the nature of the sexes for us to expect any change in the future which would be of any prophylactic value.

For other details reference should be made to the section on Conception and Pregnancy.

The chief point in all these questions is the taking into consideration of all circumstances, that is of individualizing. The occupation of the person concerned may make it necessary that various prophylactic measures be taken which are appropriate to the case. Much that has been said in the chapter on Prophylaxis in Education applies here also. The danger lies in exhaustion through over anxiety and emotional strain connected with the work, and is ushered in by a feeling of excessive exhaustion; on the other hand monotonous work which is not done with pleasure is equally bad. The passion for advancement and restless ambition have a similar effect, and lead to con-

tinuous overstrain of the powers of work and are a source of future trouble. Even when a man's efforts have been crowned with success, and he is given some new, responsible and anxious work, it would have been better from the point of view of mental prophylaxis had he remained at his former work which was less responsible and less arduous.

From the psychological aspect, the principles laid down in the introduction about the prophylaxis of training apply also to later life, though it is obvious that the mind has then become more mentally complete and less capable of modification. This feeling of completeness often does not denote any real mental completeness and maturity, and does not prove that mental development is perfect, but is rather the subjective flattering conviction that the period for training has passed. Such a feeling of security is not justified and will cause the reappearance of those peculiarities in temper, judgment and power of decision which spring from inherited tendencies, and show lack of efficient mental association, tendencies the suppression of which was we saw the main task of early mental training. The worst enemy in this respect is emotion, which appears less often as age increases but is the more lasting when it appears. Therefore deficient self control will certainly lead to those enervating moods which enforce idleness because the calm quiet judgment required for activity has been paralyzed by the emotional life, the desire and power of self control are slain, and the individual becomes gradually insufferable, showing the signs of senile involution. We shall later see that the foundation of mental disease may be laid even during this period which is still definitely one of "sanity."

This neglect to discriminate and this preference for the subjective is a sign of increasing degeneration, and is promoted by certain poisons which it is customary to take. This is especially true of alcohol, the bad effects of which have been proved. Overstrained brain workers and those whose vocation allows of very little bodily exercise should be especially cautious. Nervous people, emotional people, convalescents, and inhabitants of the tropics should

abstain altogether from alcohol, the value of which, even in febrile infective diseases, has not been definitely proved. Alcohol injures chiefly the nervous and digestive systems: the majority of cases of chronic dyspepsia, which so often tends to cause neurasthenic conditions and indirectly to cause premature arteriosclerosis, have been produced by alcoholism. The previous family history of many who suffer from diabetes, epilepsy, neuritis and anaemia, or who have an acquired disposition to mental disease, shows that the same cause has been at work. Early senility is common among alcoholics. In every case it is better to begin to abstain from alcohol late in life than not at all. Alcohol may be discontinued suddenly without any ill effects, and it has been proved that the desire for it passes completely away in a few days, and does not return if the person is otherwise mentally sound. Only in a small minority of the cases of delirium tremens—which is never a result of withholding alcohol—when there is cardiac collapse, is it justifiable to go back to the use of alcohol in very small doses for a time. It is a very grave mistake thoughtlessly to order alcohol; the physician should try to avoid prescribing it altogether.

The same holds good for morphine; and the physician is not acting conscientiously if he hands over to the patient this drug or the hypodermic syringe. It is always well to remember in any given case that much abuse of this drug occurs without our knowledge or consent.

When there is a predisposition to mental disease, any bodily illness may cause it to break out. It is sufficient to point out that severe mental disturbance of a peculiar character is frequent in typhoid fever, pneumonia, influenza, variola, articular rheumatism, and intermittent fever; and those patients are most liable to it who are weakened from any other cause, particularly an excess of alcohol. The convalescent stage of infective diseases also requires care. Syphilis in this connexion must also be briefly mentioned. Disease of the thyroid gland, of the suprarenals, and of the liver, may all be causes of mental disease, and thorough treatment of the original disease will prevent many a

psychosis. Disease of the organs of special sense requires very careful treatment, more especially catarrh of the middle ear, which is so common, and causes subjective noises that give rise to hallucinations. Certain drugs must be used with great caution, such as atropine, morphine, quinine and salicylic acid. Iodine, bromine and arsenic will in some cases, especially in alcoholics and those suffering from diabetes, produce nervous and mental disturbances, which may even pass into severe delirium. Many a delirium apparently due to fever is due to a drug. We should therefore begin with very small doses and discontinue these drugs as soon as possible.

The following general conditions are of importance in mental prophylaxis—a quiet contented business life and a happy family life, an income sufficient for the purposes of life, pleasant social intercourse, sufficient recreation regularly, and the avoidance of dangerous emotions, such as grief, sorrow and remorse. If a serious condition seems to threaten, the danger of mental injury may often be prevented by some simple measure, provided only it is adapted to the individuality of the patient. While in some cases complete rest is indicated, in others the mental balance may be preserved by increased duties. Some should be advised to travel, others are better at home. The work that made the patient ill may effect a cure if differently apportioned. A longer night's rest, overfeeding and massage will in many cases prevent nervous disturbances; on the other hand, one must be very cautious about the kind of amusements in which the patient indulges.

Obstinate insomnia may often be easily removed when the cause has been discovered. Hypnotics should not be at once prescribed, but an exact inquiry should be made into the daily occupation, and more especially the evening occupation, and all exciting factors must be removed. Instead of these we should recommend some easy mental occupation—translation, the making of epitomes, or drawing from a copy—according to the individual's taste, and this should be of brief duration and regularly alternated with rest in the recumbent posture and with gymnastics

which should also be of short duration. Singing exercises are sometimes useful instead of gymnastics.

Care of the body, both by gymnastics and by baths, is of extreme importance. Hardening the skin is of the greatest prophylactic value for the whole body; for it would seem as though accustoming the skin to peripheral stimuli produced increased strength of resistance against mental influences.

The climacteric and old age are physiological events of life. It has been shown that at these periods the individual is more liable to get mental disease, and greater care is therefore required at these times. The onset of senility should be kept away as long as possible, and its disturbing effects made as harmless as may be. For the former purpose the best means is an all-round hygienic life from youth upwards, the avoidance of alcohol and of work and emotions that are a source of worry. Arteriosclerosis is an important factor in the development of senile decay, and should be treated to prevent further inroads of the disease. A very strict diet to reduce the tendency to the deposit of lime and to cause excretion of the lime, together with large doses of potassium iodide, may be of use. The regulation of the gastro-intestinal functions and of the evacuation of the bowels is far more important even than in younger people. Diet and bodily exercise, hydrotherapy and massage of the abdomen often act rapidly, and should be tried in every case before laxatives are resorted to. Among the latter vegetable laxatives are preferable. It is most essential that they do not disturb the gastric functions. The first signs of senile degeneration may become manifest after some excitement, some great effort, or after infective disease, and prophylactic measures should be directed to these. Operations in advanced age are specially dangerous: certainly here too alcohol may be the main cause, and it has been shown that the delirium after cataract extraction is the result of alcohol.

Special Mental Prophylaxis

Whether a man who is perfectly well ever becomes mentally affected is still a contested matter and is difficult to prove. This at least is certain—that many of the injurious conditions mentioned above in the general section may lead to no bad effects, even though they are severe and combined with other predisposing elements; on the other hand the conditions of life are such that these very strong natures are fewer than formerly. It is our duty in any doubtful case to prevent mental derangement; yet this is very difficult in those cases of mental disturbance which develop without evident cause in one who seems perfectly healthy.

We are more familiar with the causes of those mental changes found in individuals whose conception, foetal life, birth and childhood lack all prophylactic care. They are indeed hereditarily tainted. Upon such a soil certain psychoses appear so exclusively that they have been grouped together under the name of degenerative. There are degenerative conditions in the narrower sense, namely, idiocy and imbecility, epilepsy, hysteria and neurasthenia, though among the last named very many are undoubtedly acquired; and lastly recurrent insanity, melancholia and paranoia.

Prophylaxis for Degenerates

Preventive measures may be used very early; this is the more easy because the family history often enables us to know with certainty that the child is a degenerate; moreover, pathognomonic signs appear early, many of which we have already named. Such children are often over sensitive to sense stimuli; this causes much agitation and increased irritability, disturbance of nutrition, of sleep, and of the general health, which still further reduce the power of resistance. Timely help is very necessary in these cases, otherwise the irritability and frequent uncontrolled emotions oppress the mind more and more. It is best to

let these children remain quiet, and to take them up only to feed them and wash them, and not to take any notice of their crying unless it is caused by some direct bodily condition; it is best also not to play with them, and they should be accustomed from the very first to sleep in the dark. Such a child will certainly remain a little backward through this treatment, but this will later be quickly made up, and it is most essential thus to delay intellectual development in degenerates. The greatest regularity of life is necessary, and punctuality for meal times and for going to bed must be insisted upon. Each child should have its own bed, both because it can rest better and because sexual excitement will thus be avoided. We must assume that the parents are intelligent and themselves free from disturbing elements, otherwise the doctor's efforts will all be in vain. Often it will be our duty to try and remove the parents' influence altogether when it is injurious, but this attempt often fails.

All over indulgence is especially bad for degenerate children, who are very apt to have a tendency to it. An attempt should be made to increase the mental power of resistance by strengthening the mind. One should not sympathize too much with them about bodily pains and wounds and illnesses, but cultivate an indifference to pain. It may be helpful to divert the attention, or in older children to appeal to their sense of honour. The children should early learn to do without things that they like, and should learn to renounce all that would be injurious for them. They may very early show a tendency to an almost uncontrollable preference for certain ideas: in these cases early mental gymnastic exercises should be used as prophylaxis against the insanity of fixed ideas. In every such case we must work calmly, intelligently and purposefully; the physician who understands the case will be best able to draw up a full plan for the treatment. Punishment is quite out of place for certain degenerates; and in no case should punishment be inflicted when under the influence of emotions. For those characteristic outbreaks of defiance and anger, which are without doubt morbid, the

child should be put to bed after a lukewarm bath followed by a little cold water; chastisement may do very great harm in these cases, and it also does them harm to laugh at them. The person who looks after them should guard himself against automatically completing the connexion between an unpleasant impression and an emotion of anger, which is so very close a connexion in most people.

In regard to diet, milk should for a long time take the foremost place; alcohol in every form, tea and coffee, should be altogether avoided. The food should be unirritating, digestible, nutritious, but not too plentiful; the evening meal should be frugal and without meat, but fruit is very good; it should be taken early to allow an interval between it and going to bed. The bowels must be attended to and care be taken that there are no intestinal worms. An anthelmintic may prevent serious disturbances.

The physician must meet the increased demands made by school life. Much has already been said about this in the general section.

A long night's rest is very important for degenerates and it must not be less than nine to ten hours till the period of puberty is reached, or till later if puberty appears early. The child should get up directly after waking in the morning. Other apparently trivial matters, such as the colour of the dress and the pattern of the carpet, may be of great importance in over sensitive degenerates. In one case it will be important to select neutral tints; in others to give preference to the child's favourite colour, for this colour will often decidedly improve the child's general mood, its condition and power of work. Regular cold ablutions and baths, gymnastic exercises, sensible games which the child likes, are of the greatest benefit. The question of diet must also be kept in view. The intellectual development of neuropathic children should be artificially delayed, otherwise they will be threatened with the danger of exhaustion and all its serious consequences, particularly those highly gifted children whose genius has grown up to some extent on degenerate ground. Here also restriction is needed, and we must insist upon frequent periods for

relaxation, although there may seem to be no absolute need for rest. The same course must be pursued in cases where a scholar suddenly gives way who was till then well able to work. This weakness may be temporary, but not seldom it is a sign that the bodily and mental power of development is at an end and will not yield to ordinary periods of rest. In these cases we must, for the child's sake, give up all idea of one of the higher vocations in life, and try to overcome the social prejudices felt against other more suitable occupations.

The sexual instinct may show a number of variations from the normal as regards the time at which it first appears and its strength and nature. Neither masturbation nor any of the other perverse habits is in the narrower sense characteristic of degenerates; but there is a special tendency to hold on to them if they are uncorrected by normal ideas. Here again a cautious selection of the surroundings is the best prophylaxis, and it must be pointed out that caution is not necessary only in boys' schools; there are also girls' schools where the traditions and mode of life have demoralized generation after generation of pupils. If the sexual feelings are over sensitive all stimuli must be removed, and it may even be necessary to separate the child from the other sex altogether. On the other hand seclusion and solitude should be combated by instilling ideas in a social direction—employment, work and active games. Bodily exercise is also very useful for timid children who lack self confidence: to increase self esteem often removes instinctive habits against which the degenerate is powerless. Hypnosis may also be useful: for the conditions and risks reference should be made to the general section.

The numerous other peculiarities of puberty are well known. In degenerates many of these may be combined and may possibly last beyond the developmental period. The best prevention will be a training psychologically arranged, but it should be remembered that mental self help is often to be found in some peculiar fancy. These very idiosyncrasies of puberty, which destroy the power of the ideas and of fancies connected with old associations,

are the surest proof of the degree of our success. If the treatment do not suffice, other ideas which also belong to this period of life may be accessory helps: the appeal to good taste, to the feeling of elegance, to courtesy, will all be of prophylactic value. Flirting and much similar nonsense will cease when it is recognized that it is not at all original, but a common everyday occurrence.

Reading may exercise a very baneful influence, and so too may religious questions which excite the imagination. Theatre going should in some cases be prohibited.

The care which is exercised at times of great physiological events and when making important decisions which bear on life, is even more necessary in degenerates. Moreover we must not seek to find a sovereign remedy in early marriage. The degenerate, especially when highly gifted, must be warned and guarded against overzeal and overwork at his vocation. Under some circumstances it may be of prophylactic value for the patient to live in some small town where there are few disturbing elements.

Experience shows that when slight mental disturbances have appeared with puberty, they are very apt to reappear with the climacteric in a similar form.

Malformations due to arrest of development in degenerates, which are signs of degeneration, may be the cause of many abnormal conditions, and in many cases operative procedures are then indicated for mental prophylaxis. But this is not the place for further details on this subject.

The transition from a mild form of mental disease to a severe form is similar to the transition from health to disease. Those measures required for marked degenerative mental disease do not belong to prophylactic teaching; nevertheless similar symptoms may temporarily be met with in those who are still sane, and we must therefore briefly mention their treatment, the more so because it is our duty to adopt measures which will prevent the case from becoming worse.

Emotional disturbances may be very successfully treated by prophylactic measures. The pathological irritability may, even when early training has been neglected, be

lessened by later training. First one should order a complete change in the life and surroundings, either letting the patient travel or go to a sanatorium, and guarding him so far as is possible from all emotions, especially from those which are painful. When his mind has become calm we may commence to strengthen it by regular mental exercise, beginning with quite easy exercises and leading it into other directions by definite objective work, always done for some purpose, and also by suggestion. Hypnotic suggestion seems less useful, but in some cases it may be recommended from time to time. This latter method of psychotherapy seems to act well in the more depressive forms of emotional disorders. Instead of diversion of the mind for these cases, some easy useful work, complete rest from work and much rest in bed are of value. Recurrence may be prevented later by a regular healthy life, with some pleasant occupation which brings with it no overstrain and, more particularly, no responsibility. In more expansive moods carefully regulated physical labour of longer duration is often curative. It should always be remembered that it is not the pathological permanent state of mind itself (though this is generally partly organic, or at least has developed so as to become chronic), but the many and oft repeated exacerbations produced by little upsets, unpleasant impressions often not owned to, and peculiar prejudices, fears and troubles, to which the cause of the mental affection is traceable, and a skilful inquiry into the history often therefore supplies us with very valuable hints for prophylaxis.

Uncontrollable ideas are a marked sign of degeneracy. The persistence, strength and predominance of these ideas leads to the insanity of "fixed ideas," which may be most troublesome and interfere with the work of life. Prophylaxis by training has already been mentioned. In these forms there is deficient power of attention; the inability to concentrate the attention may be the effect rather than the cause, and exercises in attention which are adapted for the individual, and objective and engrossing work according to a regular time table of work are needed. Under certain conditions hypnotism may act as a preventive. The bodily and mental

power of resistance must be increased and self confidence developed. When such insanity is fully developed it must be undone methodically, step by step, under the constant co-operation of the physician. Bromides and opium—the latter for the anxiety which is frequently present—may be helpful.

Secondary sensations are of some importance in connexion with this subject. These are sensory impressions, principally of the face, which arise at the same time that some other organ of sense is stimulated, appearing without any specific stimulus to call them forth and according to a regular law of gradation. Sounds more especially, but also taste, may be accompanied by a sudden mental picture of colour (*audition colorée*), the position of which in the spectrum depends upon the high or low pitch of the sound. The symptom is doubtless abnormal, but not necessarily of any bad significance. On the contrary, the secondary sensations may be of some prophylactic value if accompanied by a positive (pleasurable) tone feeling.

The Prophylaxis of Imbecility and Idiocy

The prophylaxis of imbecility and idiocy consists only in appropriate training. Weakness of intellect which is not certainly anatomical generally betrays itself very early by a bluntness of feeling and a want of spontaneous attention, and there need be no fear that a late recognition of the condition has delayed treatment by training. On the other hand in many weak minded individuals the power of development becomes lost in childhood, long before puberty is reached. There is therefore no time to be lost in making sure that a certain mental foundation is laid, so that when the time is reached when development can advance no further, the danger of mental retrogression may be prevented by constant repetition of that which has been achieved. In fact the education of the weak minded should begin at the latest in the fourth year of life. The prognosis does not depend solely upon the degree of defective intelligence; on the contrary, some idiots seem to be more capable of undergoing development within a narrow limit than imbeciles possessing greater intelligence. It

must be remembered that the capacity which a healthy child instinctively possesses for doing, observing and learning is very small or altogether absent in the weak minded, and must therefore be artificially developed. We saw in the general section that the capacity for and further development of voluntary attention was an indispensable requisite for mental development, and in cases where the tendency to spontaneous attention is stunted, mental acquisition may be impossible from the very beginning. Similarly we have to give up the attempt to call forth higher emotions and abstract ideas to aid us in our prophylaxis. Gratitude and attachment are generally wanting in the severer forms of imbecility. The characteristics which may be turned to account are the lively sensorial perceptions, the good memory which is often found in the more developed, curiosity, credulity, appreciation of music, of praise, of blame, of flattery, and of the fanciful. In some a certain fondness for the teacher, whose outward demeanour and appearance influence them greatly may be utilized, and the sensitiveness to bodily pain may also prove useful. The process of training must have reference to those simple and complex sensations which are the oldest psychologically, and therefore the more permanent through use ; the formation of associations by practice in enumerating ideas which are associatively linked, and the frequent reproduction of these by drawing and by selecting an object or a thing which possesses those peculiarities from among things put before them ; in this way ideas of and comparison between objects arise. Frequent repetition and practice in recognizing objects and in repeating their names are also to be employed. Along with this there should be practice in movements, in articulation, and in attention ; aiming at some object, listening for some sound and looking for some thing are especially valuable. Games should be selected which fulfil the same purpose, and for the sake of future work in life their practical value should be kept before the mind. Anything which involves a complex mental process, the formation of conceptions which are not simple, or of general ideas, must

not be attempted till later. The gaps produced by the inability to acquire ethical ideas must be filled in by training. The idea of ownership, respect for another's belongings, for the rights of others, must be replaced by making permanently clear the close connexion which exists between deviating from what is expressly allowed and known and the discomfort which results from it; that is punishment which is felt and which must follow directly upon the wrongdoing, but in other respects may assume various forms. In the weak minded we must obtain automatically that which in a healthy individual could be obtained by the play of various emotions. From the very earliest youth violent emotional outbreaks must be treated as strictly forbidden in order to break the child of the habit.

The very bad effect of alcohol on the weak minded needs special mention. They appear always to be intolerant of it, and the pathological conditions produced by intoxication are a very serious danger to health and to the social community.

The greatest patience, devotion and, above all, self command are essential in the education of weak minded children. It is often not possible to get the appropriate treatment carried out uninterruptedly at home; and we should then not delay to suggest that the child be sent to an institution; in many cases it is advisable to do this from the very first. The efforts made are never valueless, and are of special prophylactic power against moral insanity. All men come into the world as moral delinquents, and a purely egoistic life is first passed through, but this is soon checked in the healthy and silenced by higher motives, and loses its strength, only however by the help of education. If education is not brought to bear upon the weak minded child, who is but slightly or not at all capable of gathering experiences, of making comparisons, and of forming ethical ideas, but on the contrary is filled by unrestrained passionate impulses; then often the patient is firmly gripped by this one sided moral insanity. But there is no doubt that all weak minded persons suffer to a certain degree from moral insanity; every emotional outburst seems to point to this conclusion. These

symptoms are all of them morbid, and their consideration belongs therefore to medicine. The principles of education of the weak minded are many of them still absurd, because they are unscientific. Only those methods which are adapted to the conditions of the mind are sensible and useful, because they act by way of prevention and thereby assure the future.

Prophylaxis in Epilepsy

The causes of epilepsy are closely related to those of degeneration and to all influences which lower the power of resistance of the central nervous system, and the prophylactic measures are therefore very comprehensive. Everything previously said about prevention is applicable to epilepsy also. A few special points however require emphasis. There is first the rule that the child of an epileptic mother should not be suckled by her. The convulsions which threaten have already been mentioned; when they appear in the first days of life they show lack of vitality in the child. It is always an indication for immediate treatment by bromides, and the treatment should be continued even when the attacks have ceased.

The nervous and emotional disposition should be combated, all mental and physical overstrain must be rigidly avoided, rough games, any gymnastic exercises which cause sudden concussions, as in jumping, fighting and corporal punishment, especially boxing the ears and striking the head should be forbidden. All stimulants must be strictly avoided, particularly alcohol, which may at puberty produce an outbreak of epilepsy. Masturbation is likewise a danger. If several attacks of convulsions have already occurred, it is best to recommend private education and very carefully to arrange the division of the work, and secure a regular life and much sleep. Under some circumstances treatment in an institution is best.

From the diet we should exclude all meat preparations containing many extractives, particularly soups. Hydropathic treatment, massage and electricity should be used to strengthen the body and to keep up the spirits. Among drugs most reliance should be placed

upon bromide, but it should not be used for long periods except under medical supervision. The earlier its use is commenced the better. We may commence with large doses, but should not as a rule exceed 2 drams a day. The best daily dose is about half this quantity; for children 45 to 60 grains, for adults 75 to 90 grains; the best preparation being Erlenmeyer's mixture of the potassium, sodium and ammonium salts in the proportion of 2, 2 and 1, well diluted. Great dilution with careful attention to the skin and the bowels is the best way of preventing bromide acne. In those who are intolerant of bromides, there is danger of poisoning if it is given in large doses for a long time; this danger is reduced by giving the moderate doses above mentioned. Flechsig's opium and bromide treatment, which is so very valuable in some cases, must not be used except under supervision in a special institution. First, for about six weeks, opium only is given, commencing with ½ grain three times a day, and increasing it by ¼ grain every two or three days, though this depends to some extent upon the individual reaction to it; sometimes we can increase it by half a grain every other day. The maximum daily dose for an adult is 15 grains. Children under six years of age commence with a daily dose of ⅛ grain, and the total daily amount must not go beyond 2 grains. In older children we may increase it to 5 or 6 grains daily, and in children over twelve and thirteen years we may give up to 10 grains. While taking these larger doses the patient must be confined to bed, and treated in every way as if seriously ill. The opium has then to be suddenly discontinued and replaced by large doses of bromide up to 2 drams in the day.

Bromine has the property of expelling the halogen chlorine out of the body, and its exhibition may be made more effectual if no chlorine is taken into the body, that is if no table salt be taken; smaller doses of bromide are then generally effectual. But this must depend partly upon the digestion, which should be kept in good condition. Otherwise the addition of table salt may modify the action of the bromide.

In reflex epilepsy and in Jacksonian epilepsy operative treatment may be undertaken to remove the exciting cause. Generally there are scars, and these should be removed if they are connected with epileptic attacks or with the aura. The bromide treatment should be continued after the operation, even if successful. We cannot deny the fact that in some cases of epilepsy bromide seems to have little influence in curing the condition, and sometimes will barely ward off the attacks, but leads to a dreadful condition of stupor which accompanies those severe forms of the disease that we meet with in older cases. Nevertheless the specific value of bromide in most cases of true epilepsy is established, especially its prophylactic value in preventing the danger of an increase of the epileptic mental condition which threatens every epileptic and every child with convulsions. It is also of value in preventing the most serious peculiarities which are characteristic of epilepsy.

The Prophylaxis of Hysteria

Hysteria is, in a very large majority of cases, a sign of degeneration. Prophylaxis therefore consists in the preventive measures already recommended for threatening degeneration, and in the preventive treatment and training recommended for degenerates. It follows moreover that the cause does not lie in disease of this or of that organ, but in a morbid condition of the entire nervous system, and that to treat any one organ will be at best only to treat the exciting cause. Diseases of the generative organs are very apt to influence and impair mental activity in women, and these should be treated; but we should very carefully weigh the indications for any local interference, and we should avoid all meddlesomeness if we wish to avoid doing more harm than good. The outbreak of hysterical disturbance is most likely to occur after some great emotion, and it is obvious therefore how valuable a training is which prevents uncontrolled mastery by the emotions and strengthens self control. Even in adults much may still be done, and aggravation of the case be prevented by

adopting mental measures, by methodically practising calm self discipline, by cultivating objective interests.

Careful "waking-suggestion" is of great use, while hypnotism is good only for single symptoms, but tends to aggravate the chief trouble, which is suggestibility. The decisive factor in hysterical more than in any other patients is the power of the personality of the physician. An inconstant yet very marked suggestibility may be the result of many other influences, and in many cases therefore it is best not to allow the patient to be kept at home. It is then often seen that we have thereby deprived hysteria of one of its main supports.

We must earnestly caution against morphine. But an injection of apomorphine may sometimes have a good and even lasting result, and the remembrance of its unpleasant effect may sometimes act as a check to yielding to the inclination. Lastly, great care should be taken before giving the diagnosis "hysteria," because most of the laity ascribe to that term a moral rather than a pathological meaning.

Prophylaxis of Neurasthenia

Neurasthenia is common among degenerates, but occurs too in people who have no hereditary predisposition. It is a consequence of over stimulation, that is of exhaustion. In degenerates it is the consequence rather of a diminution of the power of resistance and of functional activity; in those not hereditarily tainted it is the result principally of irritating external relations. This gives us some insight into the prophylactic measures; on the one hand we must aim at improving the physical and mental strength of the individual, on the other hand at excluding all work which would do harm. For the former purpose we must point to what has already been said. Great stress should be laid upon keeping the young in good health. School life often prepares the ground for a later severe neurasthenia. All excess should be avoided in mental and bodily activity and in amusements: the life should be regulated, hygienic and quiet. Sufficient and regular sleep is of special importance. If nevertheless morbid conditions

arise, the exciting causes must be removed, and the irritable weakness and exhaustion must be treated, if necessary in an institution. But we must not be too ready to remove such a patient from home. In some cases the effect of removing the patient is bad, because it makes the illness public, and thereby reduces his control over these symptoms of illness and paves the way for hysterical impulses.

Masturbation is common in neurasthenia, and seems to be of some importance aetiologically. Certain pernicious habits in married life are especially injurious, but a regular normal sexual life may be of great prophylactic value. Overfeeding, the Weir-Mitchell treatment, massage, hydrotherapy, bodily and mental exercises, change of occupation and travelling, are all curative according to the nature of the case. The kind, patient and careful guidance of the physician, who so often knows how to bring the subjective thoughts of the patient into channels of objective interests, will succeed in getting many an order carried out and thereby ensure the greater certainty of success in the treatment.

Morphine must be avoided in neurasthenics, though opium is often indispensable in depressed states. While it is being used very special care must be given to the bowels. The diarrhoea so common after prolonged exhibition of opium will yield to tincture of Coto. Alcohol is specially dangerous for neurasthenics, because it gives a subjective feeling of improvement while it really exercises a very unfavourable influence on the main trouble. It is certain to cause progressive nervous disorder, and abstinence is therefore essential for the improvement of neurasthenia. We must point out also the tendency to suicide in many patients suffering from neurasthenia.

The Prophylaxis of Cyclical Insanity

The cyclical insanities, which were formerly regarded as purely emotional psychoses, have characteristic symptoms which usher in the attack. The attempt to stop the outbreak of the psychosis by atropine or by strong doses of

bromide (3 or 4 drams) offers but little prospect of success, but other measures adopted in time may prove of prophylactic value. Among these are rest in bed, careful diet and care of the body, the avoidance of alcohol and regulation of the amount of sleep, instruction of the attendant and special measures in regard to the morbid irritability, the motor impulses, and suicidal impulse; but in many cases the patient should go into an institution.

Prophylaxis against recurrence is important and should be early adopted. In regard to this experience shows that true melancholia or mania at the period of puberty points with great probability to a periodical recurrence, and that an acute onset and mild course make it tolerably certain that there will be an early recurrence.

The milder forms of disturbance are very common. In their mildest form they are more or less regular variations in the disposition, and probably remain within the limits of soundness of mental health. They can be treated quite well at home and yield readily to preventive mental treatment, which guides the motor impulses into useful channels by regulated bodily exercise and prevents any pathological aggravation. In severe cases of melancholia the patient should be sent to an institution, because of the very great danger of suicide.

Prophylaxis for the senile forms has already been given. The avoidance of alcohol, an hygienic life, pleasant occupations, and the maintenance of bodily vigour are of great importance. It should be noted that senile melancholia may show many hysterical features. The hypochondriacal preoccupation of the patient with his troubles should be overcome by constant kindness.

The Prophylaxis of Monomania

Monomania is characterized by the presence of systematized delusions and progressive illusions, and in the premonitory stages of the development of many of its features it may be influenced by preventive measures. In many cases of monomania these insane ideas cannot be traced back

to early youth, but there is an hereditary tendency to abnormal subjective conceptions which are little adapted to produce mental peculiarities that are beneficial. These children are of peculiar behaviour, distrustful, vain, and easily offended; they bear grudges, are haughty, passionate and incline to solitude, to dreaming and to flights of the imagination. In consequence of this there is very great danger of their forming impressions which are one-sided, subjective, and when the emotions are concerned even directly false, and of holding to these as fixed ideas. There is danger of their forming incorrect judgments, and of storing up memories which are correspondingly coloured; these are naturally lacking in justification, and have the peculiarity of fortifying themselves by new misconceptions. There is also a tendency to intuitive decisions as a result of incapacity for forming logical conclusions. The necessary conditions upon which monomania is based, the pathological increase of activity in conceptions and excessive prominence of the emotions in mental life, already exist in the temperament. But a well conceived psychological training may serve to check this tendency. We attach very special value to checking emotional moods when they are called forth by inadequate causes. The consciousness of having control over the emotions ensures a certain balance, even when the events are really disturbing. The emotion in its final expression becomes modified and repressed. This consciousness of self-control protects also from the feeling of mental isolation which is dangerous because irritating, and which unrestrained emotion always brings with it by reason of its one-sided origin, and still more by its subjective infective power.

It is very essential to remove the disinclination for social intercourse with others of the same age, but this requires very delicate and individual efforts. The many peculiarities often clung to with passionate tenacity can only be removed if we respect them and carefully avoid showing that we are trying to remove them. Moreover it is useful to arouse objective interests and to encourage these by work, although those who are predisposed show an extraordinary tendency

of mingling the most subjective ideas even with that which is farthest removed from them. These peculiarities continue to appear even in later life, and mental prophylaxis must not therefore be discontinued at any definite time; but calm judgement and quiet self control should constantly be practised, especially when irritating and anxious events meet us. Alcohol exerts the very worst influence in these cases, and may moreover produce certain features characteristic of monomania, more particularly the characteristic insane jealousy.

One must deal very cautiously with those affected with litigious insanity, whose illness may be considerably aggravated by unsuitable mental treatment, by transference to an institution, or by placing them under a commission of lunacy.

Reference must here be made to *prison psychoses*, in the causation of which solitude is a very important factor. It is particularly degenerates, epileptics and alcoholics who suffer from these, and an exact knowledge of the previous history may enable effectual prophylactic measures to be taken.

When there is marked mental disturbance prevention generally requires treatment in an institution; but the latter should often be avoided, and for inveterate cases when patients will not get reconciled to remaining in an institution, and are indeed harmed by the constant opposition, it is often useful to let them return to their home life. The object of prophylaxis must then be skilfully to wean the patient from his thoughts and to get him to take an interest in other things, and this is best accomplished by work which shows results and which requires the constant co-operation of the patient.

Prophylaxis in acquired Psychoses

The aetiology of some forms of insanity occurring in non-degenerates is obscure and hypothetical; this is especially the case in paralysis and dementia in the young. Other

forms, especially the insanity of myxoedema and cretinism, which possess many symptoms in common with dementia, are the result of diseases of metabolism, and we may therefore refer paralysis and dementia in the young also to chemical processes, to auto-intoxication. The causation of exhaustion psychoses and toxic psychoses is better known; their names explain their causes.

But here also several factors are at work. Exhausting influences, febrile diseases, the puerperium, lactation, haemorrhage, long continued night watching, disturbing emotions, and overstrain become very dangerous when several of them are combined. Especially common and dangerous is the combination of overstrain with anxiety and grief, and insufficient rest at night, and with these serious menstrual disturbances may often become associated. Medical prophylaxis may prevent much harm in these cases. Often unfavourable social conditions are at the bottom of it, such as certain conditions in domestic service to the irritating influences of which girls are exposed who go out to service in the early years of their development. It is very essential to keep up the bodily health and vigour in times of unusual mental strain and to get sufficient night's rest and good food. For those who are weak the English form of breakfast with its greater variety is much to be recommended; while the evening meal should be more meagre. After haemorrhage and after febrile diseases, the convalescent should be kept at rest sufficiently long to recruit his strength.

It must be again pointed out that alcoholism is a very important cause of the febrile delirium which occurs in the course of pneumonia. Different epidemics of one and the same infective disease show great differences in the prominence of some one or other of the bodily symptoms and also in the frequency with which they are accompanied by mental disturbance.

Insanity following myxoedema is the typical psychosis of metabolism and is a form of mental disturbance for which we possess an effective treatment. This consists in the administration of thyroid gland. The insanity of myxoedema

develops very slowly, and it is possible to prevent the severer forms of it by early feeding with thyroid extract. We should commence with small doses, 1 grain three times a day or 3 grains twice a day; the state of the heart's action must be carefully watched, and the dose must be very cautiously increased.

In cretinism we know what is the cause of the morbid bodily and mental condition and the method of infection, though the organized contagion is still unknown. The disease is conveyed by drinking-water and therefore clings to certain districts, especially those districts where there is an indolent people and scarcity of water which leaves no choice. But even under these conditions much may be done by way of prophylaxis. To boil the water will remove its dangerous properties; children do not get the disease till five or six years of age, and they can be protected from the disease by removing them early from the infected district; indeed even if they are removed later into healthy surroundings, an aggravation of the disease so far as it involves the mind may still be prevented. The early stage should be treated by thyroid extract.

The prophylactic education of cretins agrees in the main with much that was given in the chapter on imbecility and idiocy. Nevertheless these children show certain peculiarities which have to be considered: a certain timid submissive good nature is often characteristic of them.

Early dementia shows the symptoms of a psychosis in the narrower sense and also a number of other symptoms of disease which can be partly referred to intoxication, partly to local cerebral disease. Among the former symptoms are the sudden outbursts of excitement, the albuminuria, the increase of tendon reflexes, the excessive perspirations, the salivation, the occasional attacks of mydriasis; among the latter symptoms are certain fixed attitudes, the conjugate deviation and the Argyll-Robertson pupil. Early dementia is probably, like general paralysis of the insane, an evidence of organic brain disease, because even an intoxication may be primarily cerebral or nervous. For prophylaxis the physician will do well, in the present uncertainty as to the connexion between the

causes and the symptoms, to lay great stress upon the normal bodily functions and to take care of the general condition. It is of great importance to exclude all disturbances, such as those of menstruation, of pregnancy, and of the puerperium, and the gastro-intestinal functions must be kept in a healthy condition. If prophylactic measures have failed to prevent the disease, we must try to prevent the progress of the dementia. The best means is an occupation such as agricultural pursuits which have been so successfully developed in large institutions. It is important to utilize remissions, which may occur even in cases of advanced dementia; sometimes there are remarkable temporary improvements in the capacity for attention and sympathy, and these should be used at once for methodical endeavours to revive the old intellectual powers and to add new ones to them.

The best prophylaxis of general paralysis of the insane is the avoidance of syphilitic infection. When there has been syphilitic infection, we must urge the importance of a long continued and adequate specific treatment. We must warn against insufficient mercurial treatment.

There are however other additional exciting causes which sometimes apparently are enough by themselves to produce general paralysis; these are mental and bodily overstrain, alcoholism, tobacco poisoning, sunstroke and injury to the head. Prophylaxis must concern itself so far as is possible with preventing these injurious factors, particularly in one who is syphilitic. The general measures will be much the same as those for the prevention of neurasthenia.

In the case of paralysis it will be our duty to prevent paralytic attacks, the development of bedsores, and mental decay. The most important prophylactic as regards paralytic attacks is the careful regulation of the bowels. Bedsores can be prevented by care of the skin, cleanliness and constant attention. It is important to prevent all creases, breadcrumbs and dampness of the bedclothes; the position of the patient should be frequently altered so that he never lies in one position for long; he must be kept perfectly dry, an air or water bed should be used or a

permanent bath in which the patient may spend days. lying upon a stretched cloth; it is also well to allow the patient to get up occasionally if his general condition permit of it. Mental decay may to some extent be delayed and it is possible to prevent the unpleasant habit of incontinence of urine and faeces in some measure by regular evacuation of the bowels and by a skilful use of praise and blame.

The Prophylaxis of Chronic Poisoning

There is a great field for prophylaxis of mental disease in combating alcoholism. We have already often had occasion to point out its injurious consequences, among which in many cases we must include also so-called "tropical insanity." These consequences of alcoholism are as serious as they are numerous. Wise laws might prevent many of these injurious effects and in some countries are already in force as a prophylactic, not only against drunkenness, but more especially against the development of mental disturbances and the increase of crimes.

It is the duty of the physician to avoid the custom of allowing or even prescribing alcohol as a sedative, a tonic, to excite an appetite or to procure sleep; moreover he ought personally to abstain from it, and this is the more urgently necessary the more addicted his patients are to alcohol, because nothing so encourages the heedlessness of drinkers as does toleration of the drinking habit among those of the medical profession. On the contrary it is the duty of the physician to explain the deleterious influence of alcohol in every way, to plead for abstinence unceasingly and to support all undertakings whose object is the abolition of drunkenness.

In Institutions for inebriates it is important that the name of the institution should not in any way convey the idea of moral reproach against the inmates. Total abstinence, and not so-called moderation, will alone cure the alcoholic and prevent relapses. He who abstains does not feel the craving for alcohol, but the moderate drinker feels

it after the first taste. Therefore it is necessary to avoid this temptation and protect the patient from falling back into his weakness. It is very important that we should not hurt the feelings of one who has been cured, by unjustifiable distrust of his moral power of resistance. "Trust can alone create a sense of honour or restore it when lost" (Smith).

The temperance societies are of great prophylactic value, especially such as the Order of Good Templars. For those of weak character it is a duty to suggest that they should join one of these organizations for the sake of self preservation.

Morphinism has already been dealt with. It may be pointed out that doctors are chiefly to blame for the spread of morphinism and that they too have the greatest power to stop it. Except in an institution, morphine should never be given unless in the last stage of fatal illnesses.

The danger of relapse is much greater among those who have given up the habit of taking morphine than among those who have given up alcohol, because the craving for it lasts longer and returns with great regularity whenever great exertions, exhaustion, a feeling of depression or pain awaken a sense of need for immediate relief. The physician must be on the lookout for these conditions which create the appetite for morphine, but sometimes without any exciting cause the craving for the poison breaks out again, almost as an epileptic attack does, after abstinence from the poison for eight months or more.

The same remarks apply to cocainism, the effects of which are even worse.

Pellagra, with its polymorphic mental disturbances, scarcely belongs to this subject. It can be stamped out by prophylactic measures to prevent the grain from becoming mouldy and to prevent diseased maize from being used for food. Experience has shown that the alcohol which is derived from diseased maize produces similar injurious effects.

Poisoning by lead, mercury and carbon bisulphide are

common in certain industries and should be prevented by prophylactic measures. Perfect cleanliness and thorough ventilation are required in addition to the ordinary precautions.

Prophylaxis for Injurious Physical Conditions

In "caisson disease" to which men are exposed who work in diving bells under a high atmospheric pressure, the most prominent symptom in the majority of cases is acute paralysis, with but little prospect of cure. Here and there however delirium has been observed; the development of this may possibly be prevented by early and complete rest and the administration of sedatives.

In the tropics mental prophylaxis is chiefly required against the injurious effects of malaria, syphilis, alcoholism, unrestrained passions, and the high temperature. Heat apoplexy greatly endangers the central nervous system. Sometimes the acute symptoms are succeeded by violent motor impulses and subsequent complete forgetfulness. Heat apoplexy is somewhat common among the stokers on steamers in the tropics, and experience has shown that the work should be given up when there is evident danger of mental alienation.

It would be very valuable for the army if the army surgeons were consulted about the manœuvres to be undertaken during the hot season of the year.

The Prophylaxis of Symptoms

In the course of mental disease a number of symptoms arise which by reason of their disturbing and dangerous nature make us transfer the patient to an institution; but at the present day, partly because of the lack of judgment among the laity, partly because of want of room in asylums, these symptoms of disease often fall as a burden upon the household, and we have then not only to meet the threatened special dangers, but also the harmful influences occurring in the course of the whole psychosis.

The chief symptoms to be considered are refusal of food,

incontinence of urine and faeces, excitement and suicidal tendency.

Refusal of food may be the result of various mental causes: delusions, hallucinations, a feeling of unworthiness, negativity, general inhibition or weariness of life. Medical treatment must be guided partly by this. First one should wait a little, because a passing disinclination for food is common in mental disease and frequently gives way of itself to a regular desire for food. There are some patients who abstain from food again and again and eat so little in the intervals that increasing loss of strength reaches a very dangerous stage. These cases and those in which food is always taken in markedly insufficient quantity are the worst.

Here it is of great importance whether the patient drinks water or not. If he takes water, we may sometimes delay interference for some days, always however watching the state of the pulse.

In some insane patients the command to eat, spoken decisively, suffices to evoke automatic obedience. Other patients, the negativists, will eat if they are especially forbidden to do so.

While one will eat in company, following the example set by others, and will refuse to eat when he is alone, the very reverse will be the case with another. Sometimes it is enough if one particular person leaves the room, or if the patient is put into another bed or into another room. These often astonishing features are very common in early dementia, as well as in hysteria. We can sometimes remove the idea that the food is poisoned, by tasting the patient's food without letting him know what is the object for tasting it; but the attempt to remove the insane idea by persuasion or by explanations will almost always be in vain. If hallucinations or certain conditions of mental tension are the cause of the abstinence, an injection of morphine or morphine and hyoscine will reduce the mental obstruction and at the same time weaken the tendency to motor resistance; but it should be remembered that with many patients morphine regularly acts as an emetic. The property which hyoscine possesses of causing thirst by

drying the mucous membranes, may sometimes be of use, but it does not generally do any good in hallucinations and has no therapeutic value in a higher sense.

Feeding with the nasal tube should always be done by the physician himself. A soft elastic tube should be used, and having been oiled, it should be passed in through the nose; if one nasal cavity is too narrow, the other will be wider. No force should be used. If the tube goes into the air passage it often gives rise to no reflex actions in the insane, but it can always be known by the characteristic hissing of the respiratory air. It is quite enough if the tube has been passed so far that its opening is below the cricoid cartilage; food will then often flow better than if the tube is passed into the stomach. The food should be sweetened milk in alternation with soups, to which drinks containing fruit extracts may often be added. In case of need sedatives, wine and laxatives may be added. When the tube is being removed it should be drawn out quickly; the upper end should first be closed, so that no fluid which is still in the tube may get into the air passages when the tube passes the larynx.

Unclean habits are most radically combated by removing everything which the patient might use for unclean habits, especially the urine and faeces. There are cases in which regular injections and dry diet are unavoidable. With marked dementia this is absolutely necessary. Sometimes however putting the patient regularly on the bedpan is enough. Here again it is important to find out the cause of the uncleanliness. Again and again a negativist patient will refuse to comply when asked and directly afterwards will soil himself or the room, and the indication then is to forbid the patient to make use of the opportunity when it is given him or else directly to order him to soil himself.

It is noticeable too that the result in many cases is variable. Sometimes it is enough to let the patient remain with others or to let him be under observation, and he will not attempt to be unclean. Isolation is well known to be very fruitful in encouraging dirty habits.

Often chronic constipation is the cause of unclean habits, and the patient resorts to all sorts of manipulations because he feels uncomfortable. Removal of the constipation will here be of service. If the bowels are too loose a dose of tincture of opium every evening or an opium suppository is sometimes to be recommended. If uncleanliness is the expression of motor excitement the latter must be treated.

The idea that every condition of excitement is by itself the indication for its treatment will have to be considerably modified in an institution, because such a general application of this principle would be as unconscientious as the treatment of every rise of temperature by antipyretics.

Obviously one has to shield all mental patients from all irritating impressions; moreover mental excitement is bad for all neurasthenics and hysterical patients, and in general for imbeciles and epileptics and patients suffering from monomania. But whether it is well to check all the periodical attacks of excitement in those with periodic insanity, catatonia, or early dementia, by drugs, as is often done, seems to be at least doubtful. Instead of purchasing a momentary amelioration by weakening the brain by drugs and shortening the subsequent period of rest, it would from the standpoint of prophylaxis be far better mainly by expectant treatment to allow the irritated central organ to discharge itself and thus ensure a longer period for rest and recuperation. The indications for treating attacks of excitement when the patient is not in an institution are still more quickly and unconditionally given, and from what has been said there is still greater reason for regarding prevention as our main duty.

It is very essential that one should have a knowledge of the peculiarities of the patient and also of the art how to treat him. For this general rules cannot be drawn up. Above all it is necessary to exhibit the greatest patience and calmness to the patient. Earnest sympathy and veracity are needed to win the confidence of the patient, and this feeling of confidence will in itself act upon the patient so as to calm and be beneficial. On the other hand,

scoffing answers, a supercilious laugh, careless jests are inadmissible, firstly because they prevent the physician from being the sympathetic and helpful friend which he ought to be to the patient, and secondly because the slightest mistake in this direction will act upon the patient as perniciously as will a bad example. Many excited patients will be calmed if one will only listen attentively to them. Brief words of consolation, not too oft repeated, should be given to patients who are depressed.

General paralytics can generally be easily diverted, and from a state of violent anger be immediately brought back to a state of gentleness. The more mental personality that still remains, the more scope is there for individualized prophylaxis. In one case one can divert the thoughts and calm the patient by new sense impressions, in another by appealing to the memory or by setting some task, mental or physical, which requires some concentration of mind, and thus giving a quieting and useful turn to the originally purposeless organic craving for activity, and making the pathological symptoms instrumental for prophylactic and therapeutic purposes. An excellent way of checking a commencing irritation is confinement to bed, aided if necessary by baths or hypnotics. Warm continuous baths are often still more effectual. Both must however be carried out only under constant supervision, and the same remarks apply to wet packs. Everything which would suggest punishment must be avoided, though a sharper tone of voice used by the physician may sometimes be called for. About other details we must refer to what was said earlier. If more active treatment is needed, because of danger to the patient or his friends from his state of excitement, or to get him to the asylum, an injection of a mixture of morphine and hyoscine acts quickly and as a sedative in most cases. When the patient is calmed the physician will often be able to accomplish by skilful persuasion and by relieving the unpleasant hyoscine symptoms, what he tried in vain to do before.

The majority of patients resign themselves to the inevitable if one puts before them with friendly firmness the

necessity that there is for treatment in an institution. We should tell the patient that he is certainly ill and should let him know that his friends are of the same opinion, and in doing this we can sometimes usefully mention to him any dislikes he may have against anyone in his home circle, any ideas of persecution, and feelings of illness, and also that health will be most likely to be restored in a special institution.

If a suicidal tendency seems evident or even probable the patient should certainly be placed in an institution. It is necessary to determine whether in addition to depression there is also fear, because this emotion is apt to lead to the most dangerous surprises. Sometimes its presence is evident from the patient's appearance; in other cases we must ask the patient directly whether he has any fear, and if he says no, one should ask whether he has had fear, because this emotion appears not seldom intermittently. The inclination to suicide is generally confessed to by the patient; we need only ask him whether he is tired of life. In cases of hallucination and of dementia we have often to reckon upon a suicidal tendency. Certain conditions of rigidity often explode quite unexpectedly in the wildest and most reckless attempts at suicide. Patients suffering from depression act more purposefully: murderous attacks upon the attendant for the purpose of making suicide possible are not rare occurrences. It is strongly to be recommended that every patient suffering from melancholia, even if free from fear, should be looked upon as being as liable to commit suicide as an insane epileptic is to be dangerous to others.

Suicide can only be prevented by the constant presence of attendants. The patient's bed should if practicable be in a room on the ground floor; if this is not possible the windows must be secured. The door must be locked but should be able to be unlocked from outside. The patient must be constantly watched by a trustworthy attendant who should be exactly instructed; it is well to have regular changes in this watching. A second person should always be within easy reach.

It is very necessary that some alarm signal should be agreed upon. All dangerous objects which might be misused should be most carefully removed, such as knives, pieces of glass, cord and matches; the patients often conceal these. The bedstead must be carefully searched. If the patient covers himself over with a rug one must frequently look to see what he is doing under it. The arrangement of the room must be adapted or altered if necessary. The patient must not leave his room. Special arrangements must be made for ventilation, and only the upper part of the window should allow of being opened. A spoon only should be used for eating. In some cases an attempt may be made with plates and dishes made of baked dough. It is necessary to keep guard at night too; and sometimes it is advisable to give a strong hypnotic or a subcutaneous injection to keep the patient quiet till the morning.

It would be of far reaching value in prophylaxis if the government would make the provision for insane patients which the physician for mental diseases requires. Very much mischief would thus be prevented, many a psychosis would have a favourable issue, and the terrible increase in insanity would be reduced and thus give place to new and still curable cases. But the very best arrangements conceivable would only gradually modify the prognosis which now prevails that in most cases of mental disease the prognosis is bad. Until this state of matters can be changed by special treatment we must set our hopes upon prophylaxis and work at it with all our strength. If we are called upon to treat the disease therapeutically we find ourselves often enough unable to do it, so limited is our knowledge and power. On the other hand timely prophylaxis enables us to be masters in the treatment of the mentally sound. But it is not at all inconceivable that in the future—seeing the large number of degenerates who are a permanent danger to the community and the increasing over population of the country—the State will be compelled for its own safety and for the safety of the healthy to pass measures to secure the carrying out of mental prophylaxis.

The Prevention of Diseases of the Eye

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The Prevention of Diseases of the Eye

When I undertook the work of writing about prophylaxis in ophthalmology, I was well aware of the difficulties which would arise from this limitation and division of the subject.

The difficulty is very obvious when we consider what is understood by the term prophylaxis. In the wider sense it is the knowledge of the means by which we can protect ourselves against threatened disease; in the narrower sense that by which we prevent the results of disease already present.

This is upon the whole easy when we deal with a limited range of disease, or with some very definite group of diseases, or when we have to consider organs of relatively simple structure and simple function, as for example skin diseases and diseases of the sexual organs. But when the organ in question is so complex in structure and in function as the eye and its adnexa, then the work becomes decidedly more difficult.

In the first place it must be remembered that almost every kind of general tissue which is found in the body is found in the eye and its appendages: skin and hairs, mucous membrane and glands, striped and unstriped muscle, motor, sensory and sympathetic nerves, blood and lymph vessels; and consequently all organic and functional diseases of these structures will have to be considered under prophylaxis of the eye. To this must be added the structures peculiar to the eye which are met with nowhere else in the body: cornea and sclerotic, lens and vitreous body and their diseases; and lastly there are many functional

disturbances conditioned by the structure and use of the eyes which, without being diseases in the ordinary sense of the term, are nevertheless of great importance in connexion with the prophylaxis of diseases of the eye.

And this is not all. Prophylaxis may be of great importance under some circumstances when we have to consider some injury of the eye or some poisoning with its consequences. Neither must we forget that there are a large number of general diseases which bring in their train diseases of the eye and therefore require a special prophylaxis.

Moreover heredity and individual predisposition occupy a relatively important position especially in functional disease of the eye, and there are many physiological conditions of the eyes which under some circumstances require prophylactic measures. I will only here mention the injury to the eyes which may result from unreasonable use of them during the puerperium or during menstruation (particularly at puberty and the climacteric) although the course of these is otherwise perfectly normal.

Age has also to be taken into consideration in connexion with the prophylaxis of diseases of the eye: infancy and childhood require prophylactic measures which differ from those for adult life, and these again differ from those needed in old age. For these reasons it is quite impossible to limit prophylaxis of eye diseases strictly to "prevention of the various morbid conditions of the eye" in the ordinary sense.

The prophylaxis of diseases of the eyes, if it is to be useful, passes on the one hand far into the field of general prophylaxis, and on the other hand just as far into the field of general and special pathology; and because operations, injuries and poisoning from occupation have also to be considered, it passes also into surgery, the treatment of accidents and trade hygiene.

We have therefore to take into consideration almost everything which would have to be considered in the prophylaxis of the various diseases of the various organs of the body, and in addition everything that is peculiar to the special functions of the eye.

And there is still another difficulty to be overcome: to take venereal disease for an example, there is only one cause to be considered in regard to the causation of syphilis—contact with syphilitic virus, and only one result—namely the various manifestations of syphilis; while in diseases of the eye we find that on the one hand one and the same cause may produce the most diverse results, and on the other hand that one and the same disease may be produced by very different causes.

I will merely mention first as an example of organic disease that interstitial keratitis may be the result of syphilis, tuberculosis, rheumatism, gout, influenza or injury: and as an example of the consequence of functional misuse, that close work may, according to the disposition of the individual, give rise to spasm of accommodation, to myopia, to weakness, or on the other hand to spasm of the internal rectus, to retinal asthenopia, and ciliary neuralgia, and as a further consequence to conjunctival hyperaemia, to conjunctivitis with its secondary affections, and to hyperaemia of the optic nerve.

An inquiry will therefore embrace the following points:

1. How we may prevent diseases of the normal eye which arise (*a*) directly by injury either organic or functional; (*b*) indirectly by injuries to other organs. Under this category comes also the large subject of wounds, poisons, and trade prophylaxis, together with the prophylaxis of inherited morbid tendencies.

2. We have to consider how we may prevent disease which has attacked one part of the eye from spreading to other parts of it; for example how in disease of the lachrymal sac we may prevent its extension to the cornea.

3. Further how we may prevent the later sequelae of disease of the eye; for example how we may prevent the development of secondary glaucoma as the result of existing iritis.

4. How disease of other organs may be prevented from extending to the eye.

5. What must be done when disease of other organs has extended to the eye.

6. How we must act in reference to physiological conditions which may endanger the eye.

7. How surgical prophylaxis for the eye is to be obtained.

From what has been said the reader will see what great difficulties are presented even in the attempt to systematize.

Nevertheless I have endeavoured in the following pages to present the subjects of the prophylaxis of diseases of the eye systematically.

I am well aware that my system is not yet perfect and presents many defects, and that frequent repetition and references to other parts seem unavoidable; but I hope for indulgence seeing that a first attempt is never faultless and is always capable of improvement.

Classification of the Prophylaxis of the Diseases of the Eye

I divide the prophylaxis of diseases of the eye into—

A. General prophylaxis.

B. Special prophylaxis.

C. Prophylaxis at the various periods of life.

A. General prophylaxis deals with injurious conditions which act upon the eye and may produce disease of the eye, irrespective of the period of life, and without entering specially into the particular form of disease which may be produced.

B. Special prophylaxis falls into a number of subdivisions—

1. Prophylaxis in disease.
   (*a*) Prophylaxis of the various organic diseases.
   (*b*) Prophylaxis of functional disturbances.
   (*c*) Prophylaxis of disease and functional disturbances of the eye which may arise in the course of general disease.
2. Prophylaxis in trades, accidents and poisons.

3. Prophylaxis in heredity.
4. Prophylaxis in operations.

C. Prophylaxis at various periods of life has to consider the differences in various prophylactic measures required to adapt them to the age of the individual.

A. GENERAL PROPHYLAXIS

General prophylaxis has, as above mentioned, to deal with those factors which tend generally to have an injurious effect upon the eye.

These factors may be variously arranged, either according to their effect or according to their nature. If we arrange them according to their effect they may be divided into two main classes: injurious conditions which in general produce only one definite disease, and injurious conditions which may produce various morbid conditions.

This arrangement is not however a practical one, because one and the same kind of cause may, according to the predisposing factor, give rise sometimes to one definite disease, sometimes to very different kinds of morbid conditions. It seems therefore more rational to base the classification not upon the effects but upon the causes, and in this chapter on General Prophylaxis to consider the effects only in the following way. Those aetiological factors which exclusively produce the first class of effects will be merely named here, but described in detail under Special Prophylaxis; while those aetiological factors which give rise to the second class of effects will be considered fully here, but under Special Prophylaxis there will be only a reference to the particular section under General Prophylaxis in which they are dealt with.

If then we consider the various factors from the purely aetiological standpoint, we find that they fall readily into three different groups—

1. Causes from without, that is causes of disease which produce purely local injurious effects upon the organ regardless of the general condition of the body. These may be subdivided into—

(*a*) Mechanical effects.
(*b*) Physical effects.
(*c*) Chemical effects.
(*d*) Infective and parasitic effects.

2. Causes from within, that is causes which are the result of general conditions of the body, partly physiological, partly pathological, and which produce injurious effects upon the eye. These may be—

(*a*) The general conditions of life.
(*b*) Physiological conditions.
(*c*) Heredity.
(*d*) Dyscrasias, general infectious and non-infectious diseases.
(*e*) Poisons.

3. Functional disturbances, that is injurious effects which are produced by definite activity of the eye beyond the limit within which it is capable of working physiologically. These may be subdivided into injuries which arise—

(*a*) From the way in which we work.
(*b*) From the kind and amount of work which we do.

1. Causes from Without

(*a*) *Mechanical Causes*

Mechanical injuries may, according to their intensity and nature, produce all kinds of pathological conditions, from a slight irritation of the conjunctiva up to complete loss of function of the eye or loss of the eye itself. We have here to consider all the causes which may mechanically affect the eye from without, beginning with the shorter or longer action of all kinds of dust and the entrance of small foreign bodies into the conjunctival sac and cornea, and thence to the penetration of the eye by foreign bodies moving with a great momentum; injuries with a sharp or pointed instrument and destruction of the eye by the effect of blunt force.

The nature of the diseases and injuries which may arise in this way will, in so far as preventive measures are possible, be considered under the special prophylaxis of the various constituents of the eye and under the prophylaxis

of diseases of the eye resulting from the occupation. Here we will merely say that foreign bodies which lodge upon the surface are the commonest cause of injury. Soot, dust, pieces of stone, small pieces of iron, powder, lime, ashes, road dust, insects' wings, or pieces of chaff from corn, get into the eye, and are fixed upon the surface or are pushed under the eyelid in closing the eyes. Fortunately these injuries are mostly insignificant, unless they produce infection by being allowed to remain in the eye. But those injuries are more serious and often lead to loss of the eye where the foreign body has penetrated the eyeball, or when the foreign body has been carried into the interior of the eye.

Though some of these are purely accidental causes, and could not have been avoided by the person who met with the mechanical injury, yet a large number of these injuries are avoidable.

Hermann Cohn found from an investigation of statistics of cases of blindness that 39 per cent. were caused by injuries received while at work; 21 per cent. were children, the greater number of whom owed the loss of their eyes to thoughtlessness when playing. The remaining 40 per cent. lost their eyes partly through direct assault, and among these were reckoned injuries sustained in war, and partly through causes which were scarcely, if at all, avoidable.

Prophylaxis against these mechanical injuries to the eye is obviously impossible for the last named 40 per cent. of cases. The 21 per cent. of injuries sustained through thoughtlessness and mischievousness, especially in playing, might be prevented by proper instruction. The matter is different in the case of the 39 per cent. of injuries sustained at work.

Prophylactic measures of a purely mechanical kind may prevent much harm: as, for example, the use of suitable protective spectacles while at work and the placing of guards around machines which are likely to endanger the eyes.

Details about this will be found in the chapters on special prophylaxis and prophylaxis against injuries in trades.

(*b*) *Physical Causes*

Three forms of physical causes have to be considered in prophylaxis for the eye—

1. Injuries produced by dazzling light.
2. Injuries produced by heat. And
3. Injuries produced by the action of electricity.

From their very nature it follows that these three kinds of injury cannot be strictly separated one from the others. Although light may often be only dazzling, intense light is generally combined with great heat; and the direct action of strong electric currents and electric discharges upon the eye generally produces intense dazzling and heat effects in addition to the specific effect of the electric current.

First we shall consider the prophylaxis of dazzling by itself; then the combined causes of heat and dazzling light, and electricity in combination with heat and dazzling light. The function of the eye is "to receive the ordinary characteristic ether vibrations which make the individual conscious of the sensation of light," and the sensitiveness of the eye for light stimuli is therefore extraordinarily great.

Fortunately the power of adaptation of the eye to the enormous differences in the quantity of light which it has to receive is also extraordinarily great and depends upon many contrivances. Not only does the pupil adapt itself to the amount of light received by dilating or contracting, but researches during the last few years have shown that the pigment layer of the retina also plays a large part in the power of adaptation. According to the greater or lesser intensity of light received by the retina, the retinal pigment wanders forward between the rods and cones or withdraws into the cell—sometimes surrounding the visual elements like a protecting mantle, sometimes allowing them to be freely exposed to the effect of the light; moreover the bleaching and new formation of the retinal purple is also probably concerned with adaptation. But this power of adaptation has its limits, both absolutely and relatively.

The absolute limits are the minimum of light required to make the eye physiologically active, and the maximum of

light admissible which will not impair the physiological activity of the average eye. The relative limits depend partly upon the subjective sensitiveness to light of the individual, partly upon the power of resistance possessed by the eye of that individual, partly upon the power of adaptation to variations in the illumination within shorter or longer periods of time.

If the eye is not to be injured, the illumination must not fall below a certain minimum nor rise above a certain maximum; and further, an eye not accustomed to intense illumination can only bear a lower maximum of light without being injured by it than can an eye accustomed to stronger illumination; and on the other hand an eye accustomed to a certain quantity of light may find a minimum uncomfortable, though another eye accustomed to work with but feeble illumination may find this minimum not directly harmful. Moreover rapid variations in the intensity of illumination may be injurious, although the maximum and minimum limits for that individual eye are not passed, if these differences in illumination follow one another rapidly and suddenly.

In the question of the effect of light upon the eye we have then to consider both "too much" light and "too little" light.

The present section has to deal only with "too much" light, particularly when the excess of light is capable of producing rapid anatomical changes giving rise to serious visual disturbances. The slighter degrees of dazzling produced by sunlight, or artificial illumination will be mentioned under the prophylaxis of functional disturbances. Injury caused by deficient illumination will also be dealt with there.

In considering the consequences of too intense illumination of the eyes two factors need to be borne in mind, namely the results of too intense an effect by the visible rays and the result of excessive action of the so-called invisible rays—the ultra red and the ultra violet rays. By the term "dazzling," used in the narrower sense, we mean the excessive action of the visible rays only upon the retina.

The ultra red rays are absorbed by the aqueous and vitreous humours; the ultra violet are mostly kept back by the refractive surface of the eye and by the lens. The visible rays alone pass in almost undiminished strength through all the refractive media to the retina.

If the retina is illuminated by too intense a light, especially by sunlight or the light of an arc lamp, the spot where these rays are focussed upon the retina becomes considerably altered, and this is probably due to this spot being more or less burnt. In severe cases the structure of the retina may be completely destroyed. The subjective symptom of this process is the appearance of a dark speck which gives the patient the sensation of a positive scotoma. In mild cases the power of vision may gradually be completely restored; in severe cases the dark speck is permanent, and in the severest cases there may be complete blindness. The disorder is most frequently met with at the time of a solar eclipse, because individuals, not knowing the danger, endeavour to observe the phenomenon without adequate protection. These cases of dazzling are also the consequence of the foolish rivalry, especially among children, of looking at the sun as long as possible with the unprotected eye. The disorder has also been met with in people whose occupation includes the regulating of arc lamps, or who from want of care or from ignorance of the danger intentionally look into the light of an arc lamp for a long time with unprotected eyes.

The most important prophylactic measure is naturally to spread as widely as possible a knowledge of the dangers which are associated with the direct action of sunlight and of arc lights upon the eye.

If one is obliged or wishes to look at the sun or at an intense artificial light, especially the arc lamp, then as a prophylactic against being dazzled by the sun, the use of smoked pieces of glass or of several pieces of complementary coloured glass should be recommended. To protect against the action of an electric arc light, it suffices to wear protective spectacles of the darkest tint, or even better to use complementary coloured glasses.

This dazzling by visible rays must be sharply distinguished from that by the invisible rays. For while the visible rays act upon the retina, the invisible rays act principally upon the protective organ of the eye and the anterior segment of the eyeball.

The ultra red rays play only a small part in this, and if allowed to act upon the eye will set up an immediate but trivial irritation which will disappear in a few hours. The ultra violet rays on the contrary have this peculiarity, that their effect is not felt while the rays are acting upon the eye, but after the lapse of some time, generally several hours, a severe irritation of the conjunctiva, cornea and iris sets in, which may last several days.

This form of dazzling occurs in snow blindness and in inflammation of the eye caused by electricity. The characteristic of this form of disorder is that the symptoms of irritation of the retina are only an intense photophobia, which is produced less by any direct lesion of the retina than by severe symptoms of irritation in the region of the anterior section of the eyeball. Inflammation of the eyes caused by electricity may sometimes be combined with a true dazzling in the narrower sense. It is not within the scope of this book to say more about this disorder and its causes.

The prophylaxis against snow blindness is to wear "snow spectacles." These spectacles should have very large grey smoked glasses of the shape of a mussel shell. The glass itself has the property of holding back the ultra violet rays, and need not therefore be very darkly smoked.

To prevent inflammation of the eyes by electricity protective spectacles of the very darkest kind of glass must be worn, because here we desire also to hold back the visible rays.

From the action of the ultra red rays of light upon the eye we must distinguish the effect of heat upon the eye that is the action of the higher degrees of heat.

Apart from direct burning, in its various grades, which may occur in the eye or its protective organs, and which will, so far as they are concerned in prophylaxis, be con-

sidered under special and trade hygiene, we shall have to speak about the effects upon the eye of the longer or shorter action of intense heat though this does not cause any direct burning. It gives rise to a more or less rapidly developing cataract. The requisite prophylactic measures will be given in the corresponding chapter on trade hygiene. This form of injury has been referred to here because it has been observed as the consequence of being struck by lightning, but from the nature of the case it follows that there is no prophylaxis against this cause. This injury may be characterized by a combination of the dazzling effects by the visible rays, the severe action of ultra violet rays and the effect of intense heat.

(c) *Chemical Injuries*

By chemical injuries we understand those injuries in which the pathological conditions of the eye have been caused by chemical reagents which act, partly by causing nutritive disturbance, partly by direct chemical decomposition (chemical combinations), or by direct destruction of the tissue. These effects are special, and will be dealt with under the prophylaxis of organic disease and prophylaxis in occupations.

(d) *Infective and Parasitic Causes*

These injuries are very various in their nature. Infective and parasitic causes acting from without are first of all limited to the eyelids, the conjunctiva and lachrymal organ, and the anterior part of the eyeball where direct lesion is possible, but may affect the whole eye, and sometimes secondarily the whole body. The various kinds of injury will be dealt with under special prophylaxis, because the prophylactic measures will differ according to the nature of the infection.

The general preventive measures to be observed are identical with those given for the prevention of one of the commonest infectious disorders of the eye, namely trachoma, and we refer the reader to that section of special prophylaxis.

2. Injuries from Within

The foregoing section has dealt with injuries and their prevention, when the action is independent of the bodily constitution and of the physiological use of the eyes. The following section will deal with those factors which are dependent upon the constitution and may give rise to pathological conditions in the eye.

The first to be considered is—

(*a*) *The General Mode of Life*

It must first be pointed out that by the "general mode of life" are meant all those more or less voluntary activities of the individual over and above the physiological activity of the organ of sight, and that it does not include the manner of life in relation to the direct use of the eyes.

In so far as these have reference to the time of life of the individual, they will be dealt with in those special chapters.

Here we have to consider the mode of life in relation to ventilation of the home, cleanliness in general, clothing, food and the use of stimulants and correct arrangements for alternations in work, recreation and sleep.

The greater or less pureness of the air around us is of the greatest importance for the organ of sight as well as for the whole body. To stay in an inefficiently ventilated room has a twofold injurious action upon the eye. On the one hand the eye will be injured because general metabolic changes are produced which indirectly give rise to nutritive changes in the eye. On the other hand the badly ventilated room has a direct injurious action upon the organ of sight, because the air which is laden with all possible kinds of constituents may cause irritation, especially in the mucous membranes of the eye; moreover, when the room is artificially lighted, the eye suffers quite apart from the mechanical irritation of the eye by the tiny particles of dust found in the air of a badly ventilated room. Further the irritation of the mucous membranes of the respiratory organs, set up by the impure air, will also

indirectly affect the eye. The special forms of possible injury will be dealt with under special prophylaxis, especially in the chapters on "conjunctival catarrh" and "disorders of the lachrymal organs."

Another important factor for the preservation of the eyes is a careful habit of cleanliness, not only of the head and face, but of the whole body. Indeed every oculist knows that a number of so-called scrofulous diseases of the eyes of children are cured without any other treatment than washing the children carefully.

This care in washing has also a further use which is of great prophylactic value: by bathing, or at least a daily wash of the whole body with cold water, the body is at the same time braced up against the changes of the weather, and colds with their sequelae affecting the eye are prevented.

In regard to clothing everything must be avoided which might cause circulatory disturbances. The constriction of the neck by wearing tight collars has an injurious effect upon the eye, because it hinders the return of the blood to the heart from the brain and eyes. Corsets and tight belts are indirectly injurious by setting up general disturbances of the health, especially through the digestive disturbances which they cause.

Prophylactic measures in this connexion may be summed up in this: that appropriate clothing according to the principles of general hygiene is best adapted to prevent indirect injury to the eye. One special part of the dress must be mentioned in greater detail, and that is the head-dress, and in women the veil. The headdress should be so arranged that the head is not kept too warm; else a local hyperaemia of the head and face is produced. It should be provided with a brim to protect the eyes from the sun and from foreign bodies from above, and against rain and snow. On the other hand the brim should not be so low as to prevent a free view, or even force the wearer to walk with the head thrown back, and his visual line therefore directed somewhat downwards, as is so often the case nowadays in women who wear the modern straw hats.

A veil should never be worn except in cases where it is also advisable that men too should wear veils, as in travelling in mountains and in dusty regions. Unless the meshes of the veil are very wide, it holds a layer of impure air in front of the face, so that the wearer is breathing an atmosphere similar to that of a badly ventilated room. It is apt to produce a local hyperaemia of the covered parts of the face. Moreover it hinders the clearness of vision, because the wearer looks out upon the external world through a narrow lattice, spotted veils being particularly bad.

The diet is also of importance. Every deviation from a physiologically correct diet and every excess in the use of alcohol has an injurious effect upon the eye. But insufficient food and a diet consisting of food in wrong proportions has also an indirect injurious effect. It is a well known fact that trachoma and night blindness are very common in Russia at the time of the great fast of Lent, and scurvy may leave various eye affections as its sequelae. The special injuries caused by diet and stimulants will be dealt with in the chapter on special prophylaxis.

Nothing special can here be said about a proper division of time for work, recreation and sleep: that will be best for the eyes which is best for the general health. At most we can merely say that it would be obviously wrong for a person to use the recreation hours for reading, needlework and other things which strain the eyes, unless his usual work makes no great demands upon them. Naturally it is impossible to lay down any general rules; we can merely say: the greater the demands made upon the eyes of an individual by his daily work, the greater is the necessity that he should avoid any strain upon the eyes during his hours of recreation.

(*b*) *Physiological Conditions*

The prophylaxis of diseases of the eyes produced by physiological conditions has to deal with those injurious consequences which result from a neglect to observe certain precautions in the use of the eyes during the normal action

of certain organs. The functions here referred to are especially digestion, and in women menstruation, particularly at puberty and at the climacteric, and pregnancy.

In regard to digestion prophylaxis is concerned with the period following a meal: one should avoid doing any work directly after the principal meals which would strain the eyes. During the process of digestion there is an increased flow of blood to the vessels of the digestive organs, and a correspondingly diminished flow to the vessels of the head. Thus there is in the brain and eye a certain degree of anaemia, the blood in this organ is not sufficient for great activity, and symptoms of over tiredness soon set in, which are the more severe the less the general power of resistance possessed by the individual.

During the menstrual period and during pregnancy the power of resistance and the functional capacity of the organism of the woman are probably reduced for the same reasons; consequently a relatively small amount of work produces the symptoms which result from overstrain.

(*c*) *Consanguinity and Heredity*

Consanguinity in the parents and heredity are important in connexion with the aetiology of diseases of the eyes. These diseases are very definite, and details will be found under special prophylaxis. It may be said in general that consanguinity tends chiefly to cause retinitis pigmentosa, and that heredity is a great factor in the causation of functional anomalies, certain organic diseases, such as cataract and optic atrophy, and of malformations.

(*d*) *Dyscrasias, Infective and Non-infective General Diseases*

What has been said about consanguinity applies also to dyscrasias and to infective and non-infective diseases. The question is mainly one for special prophylaxis, because these are special diseases with special sequelae.

It is only in the case of some dyscrasias, as in scrofulosis, that prophylaxis can prevent disease, and in a few acute

infective diseases and the functional disturbances which may follow febrile disease. With the remainder of these diseases prophylaxis can only prevent the further consequences of disease which is already present.

The general prophylactic measures are identical with the prophylaxis of the particular infective or general disease.

(*e*) *Poisons*

The same is true for a large number of poisons which may have injurious effects upon the eyes. The main point is to prevent the poisoning from taking place. If poisoning has set in it is no longer possible to prevent disease of the eye. The various forms of poisoning will be found under special prophylaxis.

3. Functional Diseases

Prophylaxis has a great and important task in the prevention of functional disease, because most of these diseases arise from faulty use of the eyes and are therefore diseases which owe their origin to a factor that is dependent upon our will. As was stated in the introduction, they may be caused by—

(*a*) The way in which we work; or

(*b*) The kind and amount of work we do.

Prophylaxis is especially valuable in youth. It is now conceded as an indisputable fact that short sight appears in a very large majority of cases between the tenth and twentieth years of life, and that the way in which the eyes are used and the conditions under which they are used have an important influence upon the development of shortsightedness.

(*a*) *How we ought to Work*

First we have to consider the posture assumed when at work, and secondly the illumination. Faulty posture when at work, so that on the one hand the eyes are brought too close to the work, and on the other hand the head is held in a faulty position, so that one eye is brought much closer

to the work than the other and the eyes are compelled to work in a position which deviates greatly from the primary position, may be the cause of a number of diseases: muscular spasm and muscular weakness, squinting, spasm of accommodation, accommodative asthenopia, short sight, hyperaemia of the retina and of the optic nerve, and secondary disease of the conjunctiva and eyelids, according to the individual structure of the eye and individual predisposition. The consideration of the individual factors will be found under special prophylaxis. In the following those prophylactic measures will alone be given which are generally independent of the individual predisposition.

In this chapter, as was stated above, we shall consider chiefly the prophylaxis required in the young; first for the reason given above, that neglect of such prophylactic measures in youth is especially liable to be followed by ill effects, and secondly because an individual accustomed from youth to work with the body in a correct posture will continue the habit in later life.

In youth we have to consider the time spent at school for close work of the eyes while reading, writing and drawing; and in the case of girls needlework has to be added.

And we must therefore decide what prophylactic measures will tend to prevent those functional diseases which arise from working in a faulty position; how the scholar should sit when at work; how a school desk ought to be made so as to be hygienic and prophylactically correct. And what is said about the school desk applies also to other work and periods of life.

The following particulars about school desks are taken in the main from the work of Fick.

A good school desk must be so constructed that the scholar can, without fatigue, read and write in the upright posture for hours.

If one sits straight upon a chair the centre of gravity of the body falls within an area bounded posteriorly by a line between the ischial tuberosities, anteriorly by the edge of the chair, and to the right and left by the thigh bones.

This straight position cannot be maintained for long without some support even by a man who is fully developed and muscularly strong, because constant muscular contraction is needed to keep the balance, and the attention of the individual must therefore be directed to maintaining the upright position. Directly the attention is removed from this the upright position is unconsciously relinquished and some support for the upper part of the body is sought. The school desk must therefore be so constructed that, when in use, the body should maintain a suitable upright posture for all work, be this writing, reading, drawing or needlework, and be capable of keeping upright without the help of the will or attention. This is accomplished by constructing the desk in such a way that every part of the body may remain in the desired position free from all muscular effort.

Many careful researches were made, and the inquirers are agreed upon all essential points. With classical brevity Esmarch of Kiel has condensed these points in a leaflet which he gives in his surgical clinic to parents whose children are growing up crooked. It bears the title, "How School Children ought to Sit." The instructions are—

"School children grow up crooked and short sighted from sitting in a crooked position on bad old fashioned school benches. They sit crooked when the bench is placed too far from the school desk, when it is too low relatively to the table and is without a proper back. The school bench should be such that the child must sit upright on it when reading and writing, and can sit in this position for a long time without getting tired. To effect this, (1) the seat must be at a distance from the floor or footboard equal to the length of the child's leg, as measured from the ham to the sole of the foot; (2) the seat must be as deep as the length of the thigh, measured from the ham to the back; (3) the rounded front edge of the seat must project about an inch beyond the inner edge of the table; (4) the seat must be high enough to enable the child to lay the forearm comfortably upon the table when writing, without having to raise the shoulders or lower the head and back; (5) the lower part

of the back must be properly supported when reading. These measurements alter as the child grows, and the seats should therefore be measured at least every six months and adapted to the changed conditions."

These sentences express all that is necessary to be said about a seat for children and for adults when at work.

It is beyond the scope of a work on prophylaxis to detail the various ways in which these requirements may be met; that belongs to hygiene, and in this connexion we refer the reader to Hermann Cohn's work on the Hygiene of the Eyes and to E. Fick's treatise on the Care of the Eyes.

In addition to a suitable desk other mechanical aids may be used to ensure a correct position of the body. An excellent aid is the "flap spectacle" invented by a teacher in Bâle named Müller. When the body is upright these have the position which the peak of a cap has above the eyes; but if the body is bent the flap comes down and makes it impossible to see; if the individual again sits up the flap returns to its original position. Various forms of support are also useful for this purpose. They will be mentioned in the section on the prophylaxis of myopia.

The answer to the question of the position of the body was relatively simple, but the answer to the second question, that of illumination, is complicated. In order that the eyes may not suffer injury the illumination must be sufficient but not too strong, and the method of the illumination has to be considered as well as the strength. The question is further complicated by the fact that two kinds of illumination—natural and artificial—have to be considered, and in connexion with artificial illumination there are various different sources of light. Let us first answer the question: What is sufficient illumination?

The illumination is sufficient when a normal eye, or an eye which is properly corrected, can read the finest printing fluently at a distance of 10 to 12 inches. This is apparently a very simple definition; but if we examine a number of persons we shall meet with great individual differences. Cohn found that in one of the persons he examined there

was normal acuteness of vision with one-tenth of the illumination required by another. We must therefore take some average. The minimum has now been definitely agreed to be that amount of light upon an area which would be supplied by eight (English) standard candles at a metre distance.

Various kinds of apparatus have been devised to determine the degree of illumination over an area. The two best known and the most practical are Weber's photometer and Cohn's light tester. Weber's photometer is the more accurate of the two and enables us to determine accurately the illumination of a given area in terms of normal candle power. The instrument is however rather expensive and not very simple to work, and Cohn's light tester is therefore more useful in practice. This does not estimate the illumination in candle power, but enables us to determine very quickly and simply whether a certain place is sufficiently illuminated for work. The apparatus consists of a small box, which is held before the eye, and is closed by three screens of tinted glass which can be raised; there is also a white slip of cardboard upon which are twelve vertical rows, each with thirty numbers in very small print, and this can be brought as near to the eye as is desired by being slid along a metal rod fixed to the little box. Eyes which are very myopic, or which cannot for some other reason be corrected to the normal, cannot be tested. If the normal or the corrected eye can read quickly and comfortably these rows of numbers at 16 inches when the three pieces of tinted glass are lowered, then the illumination is sufficient, because these three glasses absorb about ninety-nine per cent. of light, and the hundredth part of the light is still sufficient to enable the one who is being examined to read. If he can only read comfortably through two of the tinted glasses, which absorb ninety-five per cent. of the daylight, then the light is still sufficient for work; but if only with one glass, which absorbs eighty per cent., then the place is unfit for work. The amount of daylight may vary much in any place because of more or less dense clouds, and Cohn contends that when the conditions are thus unfavourable the place ought to be examined. This

examination under unfavourable conditions is suitable too when there are individual differences. This light tester is equally useful in the case of artificial light.

What measures must be adopted to ensure sufficient illumination, whether by daylight or artificial light?

The answer to this question does not belong to prophylaxis but to hygiene. Prophylaxis is restricted to determining the general principles. These general principles are as follows: every place used for work should be freely accessible to daylight and should be illuminated by direct daylight and not by reflected daylight. A place which is well illuminated but in which the light received has been reflected from buildings in front of it cannot be called fit to work in, because the slightest variation in the light will be felt much more intensely. Moreover the colour of the light will not be that of pure daylight, but will depend upon the colour of the building from which the light is reflected. Rooms are also unsuitable to work in when shaded by trees which stand near the windows.

The first requisite for a work place, from the prophylactic point of view, is then free access for open daylight. And it is of course obvious that all parts of the same room are not equally well adapted for working; nearest the windows is obviously the best. The further from the window the less well adapted is it for work.

The light should be so selected that the windows are placed to the left of the worker, because this prevents the work from being shaded by the hand and protects the eye from being injured by the direct entrance of light into it. If in addition there is light from behind, so much the better. These regulations have to be observed in providing sufficient light. We have now to consider how too much light may be avoided. Any place will have too much light upon which the sun falls directly. Even if the worker's face is not turned towards the sun, yet the light reflected from the book, writing paper or other work will be so intense that symptoms of dazzling will appear. The work place should be so chosen that diffused daylight can enter without hindrance but no direct sunlight. Rooms

which are exposed to direct sunlight during some part of the day must be suitably protected against the sunlight, but the screen should only keep out the excess of light, that is it should make the light equal to that of diffuse daylight. In regard to the construction of such screens we must again refer the reader to books on the hygiene of the eye.

These principles for the regulation of daylight apply also to artificial light. Here the main principle is that that artificial light is best which most closely resembles diffuse daylight in power and colour. With artificial light there is however a further question to be considered, namely temperature and the products of combustion. That artificial source of light is the best which least increases the temperature and produces fewest products of combustion. It is impossible here to go thoroughly into the question of the various kinds of artificial light, because it would take us too far into the domain of the hygiene of the eye; we shall merely say that most of the requirements are best fulfilled by an electric incandescent light with a dull shade. The next best is gas light. The electric arc light has the disadvantage of shining too unsteadily and of containing too few red rays. Next come the Argand burner and the paraffin lamp. Candle light requires that several candles should be used, otherwise illumination equal to ten meter candle power is not obtained; the more so because the power of illumination of a source of light diminishes not in arithmetical but in geometrical progression with the distance of the object.

Artificial light should be so arranged that, as in the case of daylight, it comes from the left and that the light does not fall directly into the eye. The latter may be prevented by suitable shades. These should not be transparent and should have an inner reflecting surface. Transparent lamp shades, especially when patterned, are always bad whatever be their colour, because the side light falls upon the periphery of the retina and irritates also sometimes by the different degrees of illumination thrown upon the work. They may indeed directly cause morbid symp-

toms, such as supraorbital neuralgia and partial temporary scotoma.

(*b*) *The Amount and Kind of Work*

As to the amount of work, it is of the first importance for the eye as for the body that rest and work should alternate. Now perfect rest of the eye is impossible so long as we are in the waking state, because while the eyes are open they will unconsciously receive impressions. Alternation between rest and work must be understood to mean that conditions in which retinal perception is accompanied by tension of accommodation and of the converging muscles should alternate with conditions in which there is retinal perception only, with sufficient illumination, but without accommodation or convergent activity; in other words, near work should alternate with distant work.

Near work is the chief cause of short sight and of accommodative asthenopic troubles; this will be more fully dealt with under prophylaxis for these two disorders.

As will be evident from those chapters, the disposition to these diseases is extraordinarily different: while one individual can do near work almost uninterruptedly so long as he is awake without any ill effect, another individual will be injured by a minimum of near work; there are therefore no general rules valid for all as to alternation between near and far work. To individualize is one of the chief requirements for prophylaxis. In general however we may say that it is best, especially with children, not to let near work last longer than one hour at a time without a break. Further details will be given under the prophylaxis of myopia.

As to the kind of work it is scarcely possible in the space at our disposal to consider all the factors concerned in the immense number of differences in the requirements of various callings. But we shall attempt to state general prophylactic rules.

In regard to the size of the object for which the eyes are used, we must look upon it as injurious to the eyes if, notwithstanding a sufficiency of illumination, the object is so

small that it must be brought closer than 12 inches to the eye, in order that the visual angle may be five minutes. Experience has proved that this is the smallest visual angle that enables the eye to distinguish objects clearly. If therefore the object is so small that the visual angle is not five minutes at 12 inches, the object must be brought closer in order to be clearly seen, and excessive accommodation results. This excessive tension of accommodation is then apt to produce a number of morbid conditions both functional and organic.

Further, if the work is not to injure the eyes, the object to be seen by the eye must stand out clearly from the background, that is there must be as great a difference as possible between the illumination of the object and of the background. Therefore white work upon a black background or black work upon a white ground is least apt to injure the eyes. The less the difference in illumination or colour, the greater is the demand made upon the perceptive faculty and upon the power of accommodation of the eye. Moreover the objects should give off as little light as possible, i.e. should radiate as little of their own light as possible. Work done with objects which strongly reflect or radiate light predisposes to disease.

B. SPECIAL PROPHYLAXIS

1. The Prevention of Special Diseases

In this section we shall first consider all the organic and functional diseases of the eye, in so far as prophylaxis of these is possible.

Next we shall consider those general diseases which may give rise to eye disease, in order to find out in which of these general diseases we ought to think of the possibility of the development of disease of the eye, and which forms of disease are liable to appear as the result of a given general disease. We shall in some cases have to determine whether active prophylactic treatment can altogether prevent the outbreak of disease of the eye, or whether prophylactic measures must be restricted to treatment of the eye

affection directly the first symptoms have appeared, and thus prevent more serious consequences.

In this chapter also we shall specially consider the circumstance that the presence of eye trouble or eye symptoms may sometimes show the need which exists for general prophylactic measures.

(*a*) *Prophylaxis of Organic Disease of the Eyes*

Disease of the Orbital Cavity.—Among diseases of the orbital cavity which we have to consider in regard to their prophylaxis are wounds, inflammatory affections of the orbital cellular tissue and of Tenon's capsule, tuberculous and syphilitic ostitis and periostitis, and affections of the orbit which have extended to it from neighbouring cavities; and further the diseases which may cause exophthalmos, namely exophthalmic goitre, aneurism and orbital haemorrhage.

In regard to wounds it is very important that every wound near the orbital margin, especially deep wounds of the eyelid, should be very carefully and antiseptically treated, because, owing to the loose texture of the subcutaneous tissues in these places, a rapid spread of a possible infection is to be feared. In this respect wounds in the region of the lachrymal gland and lachrymal sac are specially dangerous.

The results to be feared would be the same as in inflammatory or infective disease of the orbital cellular tissue, for example in erysipelas or sinus-thrombosis; they are great protrusion of the eyeball and inability to close the eyelids; and secondarily there would be the danger of the inflammation extending to the optic nerve, with permanent injury to the sight, and also of disease of the cornea as it can no longer be protected by the closure of the eyelids. Prophylactic treatment is then greatly needed; and we must try to prevent this disease of the cornea because the cornea may be rapidly destroyed by ulceration when there is any loss of epithelium however small. If then from any cause exophthalmos is present, and is sufficient to prevent the lids from being properly closed, and if there is also much

chemosis, then, in addition to the other treatment required for the original cause, the cornea will have to be continuously protected until the protrusion and chemosis have so far disappeared that it is again possible to close the eyelids. In comparatively slight cases, when the eyelids can be closed up to one-eighth or one-sixth of an inch, the cornea may be protected by smearing freely a two per cent. boracic acid ointment between the lids and bandaging with a warm moist bandage, or covering with a piece of lint thickly coated with boracic ointment. In severe cases, especially with marked chemosis, it is best on the one hand to reduce the tension of the lids by dividing the outer commissure, and thus prevent constriction of the chemosed conjunctiva in the palpebral fissure; and on the other hand to close the palpebral fissure by sutures through the upper and lower lids, which draw them forcibly over the eyeball. In tying the sutures one must be very careful to avoid any entropium.

These sutures must be loosened every twenty-four hours to prevent any accumulation of secretion and to see the condition of the cornea.

If when the wound was inflicted a foreign body has entered the orbit, which may set up sepsis, such as a splinter of wood, it should be removed as quickly as possible. Other foreign bodies on the other hand, especially hot pieces of metal or shot, may under some circumstances for prophylactic reasons be left quietly where they are, at least for the time being, more particularly when the Röntgen rays show that they will cause no injurious effect by their position. The general rules of surgery are here applicable.

For ostitis and periostitis it is sometimes necessary for prophylactic purposes to resort to operative interference earlier than the general principles of the treatment of these diseases would suggest. If these are situated near the orbital margin and have led to the formation of a sinus, there appears in most cases a retraction of the skin of the lid near the sinus, which secondarily causes ectropium, by drawing the edge of the eyelid up or down. This may be so great that it becomes impossible to close

the eyelids properly at that spot. The dangers to the eyeball are then similar to those in exophthalmos, and we must then at least see that the lids are brought together. The skin which is contracted should be freed and drawn into position, so that it is possible to stitch the diseased lid to the sound one; and even in those cases where it is not possible to remove the diseased bone and make a radical cure, we can succeed in making the sinus take up a less dangerous position, especially if we make a way for the discharge by providing an opening in the skin, which is kept open by a drainage tube. If this is not sufficient pedunculated pieces of skin must be transplanted to allow of drainage and to correct the position of the lids. The prophylaxis for orbital disease which results from affections of the neighbouring cavities and for tumours is similar to that for inflammatory affections and for exophthalmos; this is true also for the exophthalmos, which is the consequence of general disease.

If the ophthalmoscopic examination shows that optic neuritis is beginning to develop or has developed as the result of one of these orbital diseases, then expectant treatment under any circumstances whatever is to be condemned. In these cases the only possible way of preventing serious mischief is by energetic interference according to the nature of the case, operative treatment being necessary in most cases. In these cases we must not hesitate to remove even benign tumours, although in other cases expectant treatment is indicated for benign tumours.

Diseases of the eyelids and conjunctiva. The prophylaxis of the diseases of the eyelids cannot be separated from that of the diseases of the conjunctiva, because all factors which injuriously affect one of these parts will generally at the same time affect the other.

The prophylaxis against dangers which threaten from general diseases of the skin must be according to general dermatological principles, and further particulars about this will be found in the section on the prophylaxis of skin diseases. The same is true for those diseases of the eyelids,

which are identical with diseases on other parts of the skin, such as acne, furuncle or abscess. The prophylaxis of diseases of the eyelids and conjunctiva which may be the result of general disease will be dealt with under the prophylaxis of general diseases which react upon the eyes. In this connexion the chapters on the acute febrile exanthemata, on tuberculosis, syphilis and leprosy should be specially read, and those on diseases of the nose and throat; and in connexion with trachoma of the conjunctiva the reader should turn to the chapter on diseases of inanition and the chapter on diseases connected with occupations (nystagmus of miners). Here we shall consider only direct dangers.

These are principally wounds, the action of foreign bodies, smoke, dust, soot, dazzling light, strong wine, rain and the action of parasites. Foreign bodies, such as dust or soot, tend to cause hyperaemia of the edges of the eyelids and of the conjunctiva and catarrh, and can best be prevented by wearing plain spectacles which are large and mussel-shell shaped; glasses made of so-called mica can also be recommended.

These glasses are obviously only worn for prophylactic purposes when one knows beforehand that one will be exposed to such dangers. It is very desirable that such glasses should be worn by any one obliged to sit in a quickly moving carriage, particularly when going against the wind. That the laity have instinctively discovered this is shown by the protective spectacles which are worn by the drivers of motor-cars and which have recently been much used by cyclists.

If one must be exposed to much dust and is unable to wear protective glasses, as riding masters in covered riding schools, or soldiers marching along dusty roads, it is useful to smear the whole region around the eye and eyelids with a thin layer of fat; equal parts of vaseline and lanoline form the best application. Most of the dust will then adhere round the eye and perspiration will also be prevented from running into the eyes. Moreover one should always avoid wiping round the eyes with the bare finger. Infec-

tive material may thereby be carried into the eye, but there is also the danger that grains of sand may be directly rubbed into the eye. The habit of opening the eyes when diving or when dipping the face into the water of the wash-hand basin when washing produces conjunctival hyperaemia and conjunctival catarrh. The conjunctiva is more susceptible to contact with ordinary water than is generally believed; and in addition to this it may become infected by the water of a swimming bath. As a curiosity I may mention that I once observed an obstinate catarrhal conjunctivitis which was not cured till the patient ceased to dye her hair. Probably this was due to some chemical cause. The prophylaxis against wounds will be found in the chapter on trade prophylaxis, for we can only guard against injuries which can be foreseen. There too prophylactic treatment will be found for injury by lime and burns. Prophylaxis against the effect of dazzling light, especially by snow, and against the effect of electric light has already been given under General Prophylaxis.

In regard to prophylaxis of wounds of the skin of the eyelids, the main points are strict antiseptic treatment to prevent infection and its consequences, and a very careful bringing together of the edges of the wound and the avoidance of removing even the smallest piece of skin or of conjunctiva; as neglect of this precaution may lead to the most unpleasant deformities which have then sometimes to be made good by extensive and tedious plastic operations. In connexion with antiseptics it should be remembered that the eye is extremely sensitive to concentrated solutions of antiseptics. Corrosive sublimate should not be used in a stronger solution than 1 in 5,000, and carbolic acid than 1 in 40.

Chronic irritative conditions of the conjunctiva with secondary eczema of the edge of the eyelids may also be caused by functional disturbances, especially by excessive efforts to accommodate, as in hypermetropia and the hyperaemia of the eye and its surroundings which result from it. Details will be found under the prophylaxis of functional disturbances.

In such affections, especially when the history is obscure, we should always think of the possibility of a refractive error and make an examination for prophylactic purposes.

The most valuable task for prophylaxis is afforded by infective diseases of the conjunctiva, as infective conjunctivitis, conjunctivitis neonatorum, gonorrhoeal conjunctivitis, trachoma, and to a lesser extent diphtheritic conjunctivitis.

The prevention of these diseases is the more important because they may be the cause of more or less severe diseases of the cornea. Simple catarrh, if it lead to any corneal affection at all, may possibly cause a simple corneal ulcer which is fairly easy to heal, but in severer cases it may cause serpiginous ulcer of the cornea; but trachoma often causes more serious injury by the formation of pannus, and the other diseases named often lead to total blindness through perforating ulcer of the cornea.

In all cases the strictest cleanliness is needed. It is not by mere chance that infective diseases of the conjunctiva are very much less common among adults of the educated classes who are accustomed to cleanliness than among adults of the artisan class and among children.

If any member of a family is suffering from some purulent catarrh of the conjunctiva, strict precautions must be taken that the patient's towel, handkerchief and wash-hand basin are not used by any one else. Further it is advisable that the healthy members of the family should frequently wash their eyes with a mild astringent, such as a quarter per cent. solution of sulphate of zinc, or at least they should wash the eyes several times a day with cold or lukewarm water or with a weak solution of boracic acid or of corrosive sublimate. The same holds good in still greater measure when the catarrh of the conjunctiva assumes from the very first an endemic or epidemic character, attacking several members of a family or several children at a school or other institution where a large number of individuals live in more or less close intercourse, and are attacked by the disease simultaneously or quickly one after the other.

As a prophylactic, the separation of the healthy from the

diseased is very important. In epidemics at school the patients should always be excluded from the classes and the strictest cleanliness must be insisted upon in the school buildings. The catarrh may be caused by different exciting causes: the Koch-Wecks bacillus, the Morax-Axenfeldt diplobacillus, and Fraenkel's pneumococcus have been proved to have caused such epidemics.

Conjunctivitis neonatorum is probably the first danger which threatens the eye when the child is born; for this danger begins even while the child is passing through the genital passages, because the conjunctiva may there become infected by morbid vaginal secretion. The gonococcus of Neisser is the commonest cause of conjunctivitis neonatorum. But recent observations have shown that it may arise in the absence of the gonococcus, from infection by bacterium coli more especially.

The importance of prophylaxis against this disease is proved by the fact that in the institutions for the blind in Germany and France in 1886, it was found that two-thirds of the pupils had been blinded by conjunctivitis neonatorum. One would imagine, seeing the simplicity of the infective process, that differences of opinion would scarcely be possible; and yet two views about the subject stand in direct contrast one to the other. Cramer's explanation of the process of infection is that the os uteri pulls upon the eyelid even so as to cause ectropium, and that the infective material comes then into direct contact with the conjunctiva of the eyelids. But Wecker takes just the contrary view; he maintains that the eyelids are kept tightly closed during the passage of the child, that the infectious matter can therefore only come into contact with the outside of the lids, and does not enter the eye till some time after birth, and is caused partly by movement of the eyelids and partly by improper handling by the attendant. And corresponding with the two views we find the proposed prophylactic measures diametrically opposed.

Those who hold Wecker's opinion declare that all direct disinfection of the conjunctiva is perfectly useless. They recommend on the other hand—

1. That immediately after birth the lids and region of the eye should be thoroughly cleansed with a piece of wool dipped in a one per cent. solution of the cyanide of mercury.

2. That the entrance of any of the bath water into the eye must be strictly avoided.

3. That after the first bath the eyelids should again be carefully cleansed in the way above described.

The followers of Cramer's theory, which is the older, and generally accepted, recommend that the child shall first be washed, including the face and eyes, and that a disinfectant should then be brought into direct contact with the conjunctiva; and they maintain that aseptic prophylaxis alone is useless.

But there is again difference of opinion about the antiseptic to be used. Some recommend Crédé's method, that is nitrate of silver, others recommend protargol. Some maintain that nitrate of silver should not be used; because it increases greatly the number of germs in the conjunctiva and acts as an irritant. Also that there is no danger to the cornea from the gonococci, but that the danger comes from the pneumococci and staphylococci which subsequently appear. The compulsory use of Crédé's method is therefore they say to be rejected and protargol to be used instead. The large majority of observers however say that the difference before and after Crédé's time is so enormous that there is no reason for discontinuing it, and that the use of nitrate of silver as a prophylactic is never injurious.

The experience of the great majority of ophthalmic surgeons is that it is a matter of indifference whether one uses protargol or nitrate of silver. In favour of nitrate of silver is the fact, proved with absolute certainty, that with the introduction of Crédé's method conjunctivitis, which was before so common in lying-in institutions, has become much more rare, and the method has never caused any ill effect when properly carried out. In favour of protargol is the fact that its antiseptic value is equal to that of nitrate of silver, and that it has the additional advantages of not injuring even in concentrated solutions and of penetrating more deeply into the tissues.

The preventive treatment of conjunctivitis neonatorum is therefore as follows. Directly after division of the cord the child is put into a bath, and the eyes are at the same time washed with a clean piece of rag or wool, not with the bath water but with some other clean water, or still better with a disinfectant, for example the solution of the cyanide of mercury mentioned above. Then the child is placed upon a table, and before being dressed a drop of a two per cent. solution of nitrate of silver or a twenty per cent. protargol solution is dropped into each eye with a glass rod while the lids are drawn apart by the fingers. This should not be repeated even if there should be some slight redness and mucous discharge during the next twenty-four hours.

If an infant is brought to the physician and one eye only is attacked, the utmost must be done to prevent the other eye from becoming affected. The child's nurse must be told not to touch the region round the healthy eye, except directly after having washed her hands, and then only with a clean piece of wool and clean water or disinfecting lotion. If she wishes to clean both eyes the healthy eye must be cleaned first. The child should lie on the side of the diseased eye to prevent the purulent discharge from it flowing into the healthy eye. In addition to this, the physician should drop into the sound eye a drop of Crédé's solution or a drop of the protargol solution every day.

The attendants upon the child should be told about the great risk of infection even for adults.

Gonorrhoeal conjunctivitis may be prevented by the observance of caution and cleanliness in patients with gonorrhoea. The physician who is treating a case of gonorrhoea should always point out to the patient the risk of getting conjunctivitis, and should caution him to wash his hands every time after having touched the diseased part.

Special care must be taken to protect the sound eye when, as is usually the case, the patient comes with one eye only affected. The physician should first treat the healthy eye by washing the eyelids and putting in a drop of a one per cent. solution of nitrate of silver, or of a ten per cent.

solution of protargol. The sound eye may be protected by an occlusive bandage. The bandage may be made as a "window bandage," allowing the eye both to see and to be seen. Burchardt has the window bandage made as follows: a piece of mica is fastened between two perforated pieces of wool by means of collodion. The outside of the wool may be made waterproof by collodion, and the wool can be fixed to the skin of the nose and cheek by collodion. With the aid of such a bandage it is nearly always possible to prevent infection of the sound eye. But I must confess that I do not regard this last precaution as absolutely necessary. During the last few years I have treated infection of one eye without any further precaution except that I impressed upon the patient the danger of allowing the discharge to get into the other eye, and I used protargol drops as a prophylactic and no infection of the healthy eye occurred.

Although the exciting cause of trachoma is not definitely known, yet there is no doubt that trachoma is a disease which is conveyed chiefly from one person to another. The endeavour of prophylaxis must therefore be to prevent the conveyance of infection.

In regard to general prophylactic measures it should be remembered that infection is the most easy the more crowded together people are and the less the attention paid to cleanliness. Therefore in districts infected with trachoma the sanitary arrangements and lodgings should be supervised.

Unfortunately very little can be done by police regulations if those threatened with the disease do not understand the object and reason for the regulations. As in many other cases so here the best prophylaxis would be to improve general education in respect to hygiene. Suitable instruction, which in districts infected with trachoma should be repeated every year, combined with the enforcement of proper rules at least during the hours that the children are under the care of their teachers, would be the best way of spreading the knowledge of the necessary prophylactic measures among the population.

As an example of the way in which the authorities

might act, we append the report of the Medical Commission of the Grand Duchy of Mecklenburg on Trachoma and its Prevention. They will be given verbatim, omitting subsidiary points, because they contain all that is known about the necessary prophylaxis.

1. Trachoma is an infectious disease of the conjunctiva (inner surface of the eyelids) but may extend to the eyeball, and in addition to pain and other troubles may produce serious impairment of vision. It generally attacks both eyes and spares no age. It is a very chronic disease, generally lasting many months and often years, and is very apt to relapse. Capacity for work may be very greatly reduced by it or even altogether destroyed.

2. All the secretions of the eye (tears, pus, mucus) are infectious. These secretions may infect others through touching the face, hands, linen, or utensils used by the patient. Very often the infection is conveyed by the common use of handkerchiefs, towels and washing apparatus. The infection cannot be conveyed by the air. Uncleanliness, insanitary dwellings, deficient ventilation favour infection.

3. In order to prevent infection the following points must be observed—

(*a*) Every one should make a rule never to use pocket-handkerchiefs, towels, washing apparatus, bed linen, or tools used by others unless he knows they are healthy. Those who have any affection of the eyes must be most strict about this. Every one suffering from eye disease should very carefully prevent any of the discharge being conveyed to others; he should have and use his own things (linen, water, utensils); he should wash his hands frequently with soap and water.

(*b*) When a large number of workmen have to occupy a common dwelling, it is very advisable that their eyes should be previously medically examined. Any who are already affected should have their own special washing apparatus, towels and bed linen, and if possible be isolated, supposing that the physician permits the work to be continued.

(*c*) When a patient is found to be suffering from trachoma with a watery or purulent discharge, daily medical treatment becomes necessary in order to cure it as quickly as possible; and the patient should be taken into a hospital if other arrangements for this cannot be made.

Such treatment of the disease will most quickly remove danger of infection. When the discharge ceases, the patients are generally fit to return to work. Patients suffering from trachoma without any discharge from the eyes need not be excluded from working with others, provided that they use their own towels and utensils, but they require medical treatment. If school children become affected they should be kept away from school, and a medical inspection of the school should be made.

With regard to special directions for prophylaxis where many people live crowded together in a small space, as in barracks, schools, prisons, and orphanages, the following are the chief rules—

1. Every one entering an institution or returning to it after an absence should be medically examined. He should not be admitted if suffering from trachoma. When admission cannot be refused, for example in an orphanage, the new inmate with trachoma should be isolated and be medically treated in the infirmary of the institution.

2. Every inmate of an institution should have his own washing apparatus, bed, handkerchief and clothes. The exchange of such things or the common use of them should be punished.

3. Regular examinations of the eyes should be made by competent physicians every month or every week according to the prevalence and severity of the trachoma in the institution.

4. Permission to leave the institution should only be given to healthy inmates and convalescents.

There are a few additional rules for armies. Special mention must be made of the stringency in the Russian army about the guardrooms and prisons, because experience showed that infection was often conveyed by towels

and other washing apparatus which had been used by different bodies of troops in succession.

As to schools—in every district which is but slightly infected and in districts where trachoma appears only spontaneously, every child with trachoma should be kept away from school till it is convalescent. In infected districts it is best to arrange special schools for instructing children who have trachoma.

If trachoma breaks out in an institution which was previously free from the affection, it should if in a district free from trachoma be placed in quarantine from the outside world and, as above stated, the healthy should be completely isolated from the diseased.

Prophylaxis against diphtheritic conjunctivitis proceeds along two lines: (*a*) prevention of infection of the conjunctiva in patients suffering from diphtheria and (*b*) prevention of infection of the attendants upon diphtheritic patients. For the former care must be taken that handkerchiefs which have come into contact with the mouth and nose should not be used to wipe the eyes. Very special care must be taken in this respect with patients who already have some conjunctival catarrh, because the need to wipe the eyes from time to time, and to use the handkerchief which is so close at hand, is specially great. In very small children the hands should be frequently washed or even bound down, so that the secretion may not be carried from the mouth and nose to the eyes. Washing the eyes with a solution of corrosive sublimate is also a useful prophylaxis.

If it is feared that the eyes of an otherwise healthy person have become infected, for example by the coughing of the diphtheritic patient and in the examination or treatment of the patient, it is best to wash out the eyes carefully with a solution of corrosive sublimate, and to drop in a twenty per cent. solution of protagol.

Among the diseases of the lids and conjunctiva, prophylaxis is possible for the eczematous affections which chiefly affect the young. Children of so-called scrofulous diathesis are specially predisposed to this affection, whether the diathesis

is a tuberculous or syphilitic one, or is the result of neglected affections of the mucous membranes of the respiratory passages, or of neglect of hygiene in food and in the house. Prophylaxis will have to remove the predisposing disease and also to regulate the mode of life. The dwelling rooms should be lofty, well ventilated and dry, on the sunny side of the house if possible; baths should be given, and the child should have regular and hygienic food and should be much in the open air, if possible in the country. These precautions may do marvels in those children who before being put under the prophylactic conditions sketched above had suffered for years from constantly recurring eczematous disease. Often these new conditions of life are enough without any other treatment to cure the disease. These eczematous affections should be thus prophylactically treated because they frequently pass over into diseases of the cornea which tend to cause permanent injury. In other cases however the corneal affection is primary, and the overflowing of the secretion produces the eczema of the lids. To prevent this eyelids which show any tendency to eczema should be sprinkled with starch powder, or smeared with a thin layer of two per cent. boric acid ointment.

For the different forms of pemphigus of the conjunctiva there is no prophylaxis apart from curative treatment. We have still to mention the prophylaxis of deformities of the eyelids and deformities of the conjunctiva. Here the question is no longer the prevention of the disease, but of the consequences of the disease. The treatment for inability to close the eyelids for any reason whatever was given when speaking of exophthalmos. Other measures belong to the chapter on curative treatment.

For all other distortions there is only one radical prophylaxis, namely removal of the deformity. When there is a tendency to entropium, especially spasmodic entropium, the patient should be told to resist this tendency by frequently drawing out the edge of the lower lid by stretching the skin; and in a tendency to ectropium, especially ectropium senile, the patients should be told that in wiping the eye they should begin at the outer

angle of the palpebral fissure and thence pass inwards to the inner angle, and at the same time push the lower lip upwards.

Here we must also utter a caution against methods which are sometimes followed by irreparable harm. A few leading principles can alone be given. If incisions have to be made in the eyelid or conjunctiva, they should never be made perpendicular to the edge of the eyelid but always parallel with it; otherwise disfiguring scars and even coloboma may arise. Further we must take care not to apply iced compresses for too long a time, because these have caused gangrene of the lid; and strong caustics should not be used unless it is possible to neutralize them quickly. Astringents and disinfectants must be used in as weak solution as possible, particularly when the case cannot be constantly watched by the physician.

One should also bear in mind a possible idiosyncrasy against some one drug, such as corrosive sublimate.

Parasitic diseases will be found in the section of the prophylaxis of eye disease in general diseases.

Diseases of the lachrymal apparatus are almost exclusively the result of diseases of the nasal mucous membrane; more rarely an affection of the conjunctiva is the cause. Careful treatment of the primary disease must be the main rule for prophylaxis. Concerning the prophylaxis of the consequences of disease of the lachrymal organs, measures must first of all be directed against the accumulation of secretion in the lachrymal sac, because if not treated energetically it may result in inflammation of the tissues around the lachrymal sac, great thinning of the walls of the sac and the development of a lachrymal fistula. There are other reasons too which make careful treatment of diseases of the lachrymal organs of great importance; since experience shows that in disease of the lachrymal sac and duct, the slightest lesion of the epithelium may lead to serious disease of the cornea, more especially to that extremely dangerous serpiginous ulcer of the cornea. Orbital cellulitis may also result from neglect of disease of the lachrymal sac and duct, and deformity of

the eyelids, particularly ectropium of the inner half of the lid may also follow a neglected dacryocystitis.

In regard to the aetiological prophylaxis of injuries to and diseases of the cornea part has already been given in the sections on diseases of the orbit, eyelids, conjunctiva and lachrymal duct, and the rest will be found under the prophylaxis of general diseases and prophylaxis in trades and accidents.

Here we shall therefore merely consider the prevention of the consequences of disease of the cornea.

In any disease of the cornea it must always be borne in mind that the uveal tract may become infected by extension of the disease. The iris being next the diseased cornea will be the first part to show signs of inflammation. Consequently in all diseases of the cornea care must be taken to see whether the aqueous humour remains clear, and whether the reaction of the pupil is normal. When there is the slightest suspicion of hypopyon or of irritation of the iris, mydriatics should be dropped into the eye as a precaution. But we must always remember that in old people, and especially in those who have arteriosclerosis, the use of mydriatics, particularly of atropine, has sometimes developed glaucoma. If then there is the slightest increase of ocular tension the mydriatic must be discontinued and pilocarpine or eserine be dropped in, even at the risk of causing a synechia. In such a case, of the two evils, namely glaucoma or posterior synechia, the latter is the less, because it may afterwards be removed by an iridectomy when the disease of the cornea has been cured. There is the less objection to this course in threatening glaucoma, because in extensive corneal ulceration, with which we are here mainly concerned, an iridectomy is generally required in most cases for the sake of vision.

If spontaneous perforation threatens in a case of corneal ulcer the anterior chamber should be punctured, sometimes repeatedly, in order if possible to prevent perforation by the ulcer. Moreover if the place at which perforation threatens lies near the periphery, eserine should be dropped into the eye as a prophylactic, but if it lies centrally atropine should

be used in order to get the iris as far away as possible from the place where perforation threatens. When spontaneous perforation occurs it is generally no longer possible to prevent prolapse and adhesion of the iris. These results should always be prevented when possible, because an adherent prolapsed iris tends to raise the pressure of the affected eye and to produce staphyloma.

It should not be forgotten that after perforation of the cornea, even though the lens capsule be uninjured, deposits are apt to form on that part of the lens capsule which is adjacent to the perforation, and when permanent these tend to form an anterior polar cataract.

For similar reasons when there is a perforating wound of the cornea the prolapsed iris should be carefully replaced, or where this is impossible removed. The prolapse should be tightly stretched when snipped off so that the edges of the wound in the iris may subsequently retract from the corneal wound.

The prevention of eczematous affections of the cornea in children is that which has already been given under the prophylaxis of eczematous inflammations of the conjunctiva. The prophylaxis of corneal affections which are dependent upon general diseases will be found in the section on general diseases. These general diseases are the acute infective diseases, syphilis, tuberculosis, leprosy, diseases of the respiratory organs, influenza, cholera infantum, typhus, gout and botulism.

Conical cornea occupies a position midway between organic and functional diseases, both with regard to its aetiology and its consequences. Some regard conical cornea as an organic disease not influenced by function, while others incline to the view that the activity of the eye, particularly in near work, tends to favour its development. If we accept the former view prophylactic interference is excluded. On the other hand if we accept the second view it is conceivable that prophylactic measures to remove the optical defect may be useful.

This removal of the optical defect is best effected by Lohnstein's hydrodiascope, a contrivance by which the eye

dips into a chamber filled with normal saline solution, which rests against the orbital edge like a pair of spectacles. The chamber is closed in front by a strong convex lens.

In all inflammatory diseases of the conjunctiva and cornea the photophobia should, for prophylactic reasons, be quickly and energetically treated, because a long continued spasmodic closure of the eyelids may cause serious functional disturbances. The development of permanent convergent strabismus, as well as serious disturbances of the power of vision which may pass into amaurosis, have been observed to result from it.

The repeated dipping of the whole face into cold water is the best treatment; the eyes should also be protected from glaring light by letting the daylight which enters the room of the patient be softened by a light grey blind. But dark protective glasses and very dark rooms should be altogether rejected for such cases.

The prophylaxis for inflammatory disease of the sclerotic will be found in the chapters on syphilis, tuberculosis, leprosy and gout, because idiopathic disease of the sclerotic is unknown.

The prophylaxis of staphyloma, in so far as it is the result of scleritis, belongs partly to uveal disease and partly to functional disease, and will be found in those sections.

Wounds of the sclerotic, if perforating, should be united as quickly as possible by sutures and be covered in by stitching the conjunctiva over the wound. If it is feared that infection has occurred, or if there be early signs of it, it is best to touch the edges of the wound and the adjoining vitreous body with the galvanocautery. This procedure is needed for prophylaxis against infection of the vitreous body which is known to become infected so readily. This is the only case in which prophylaxis is possible in disease of the vitreous body, because all other diseases of the vitreous body are secondary, and chiefly the consequence of choroid disease. As an aid to the antiseptic treatment of perforating wounds of the cornea and sclerotic the use of Crédé's ointment has recently been recommended.

There is no reliable prophylaxis of the diseases of the lens. That for anterior polar cataract following perforation of the cornea has been given above. The forms of cataract met with in children are most of them congenital, or have been acquired so young—for example cataract occurring with rickets—that we have no opportunity for prophylactic measures.

That nasal disease, particularly disease of a particular spot on the middle turbinate bone, has quite recently been given as a cause of cataract is merely mentioned here as a curiosity.

The hypothesis, accepted by a few only, that cataract may be caused by excessive strain upon accommodation, and that most cases of senile cataract can be referred to this cause, suggests the prophylaxis to be adopted, and is referred to under functional disturbances. To arrest the progress of senile cataract some recommend treatment with the galvanic current, others recommend that an ointment of iodine and potassium iodide should be rubbed into the temples.

In regard to cataract which is the consequence of some general disease, reference should be made to the chapters on diabetes, atheroma, senile marasmus, obesity and chronic nephritis.

The only forms for which prophylaxis is available—and here it is only a prophylaxis against the consequences—is in traumatic cataract and dislocation of the lens. In traumatic cataract the process of swelling and of absorption should be carefully watched, because on the one hand mechanical irritation of the iris may produce inflammation of the iris; and on the other hand great swelling may lead to increase of tension. The necessary procedure belongs to treatment and will not therefore be given here; we may merely mention that early and complete extraction of the lens is the best prophylaxis.

Those cases of dislocation of the lens in which extraction is delayed for a time for some reason or other, should be very carefully watched. The dangers which may result from a change of position of the lens are of two kinds:

there is the danger of inflammatory irritation as the result of permanent mechanical interference with the ciliary body, and there is the danger of increase of tension. The former danger will only appear when the lens lies permanently or temporarily upon the ciliary body; the second danger threatens every form of lens displacement.

To prevent the danger of inflammatory irritation the patient should be placed for a long time in such a position that the lens, according to the law of gravity, will be furthest removed from the ciliary body. If the appropriate position is maintained long enough by the patient, it is sometimes successful in fixing the lens in a less dangerous position. If nevertheless irritation sets in immediate operative removal of the lens can alone check the cyclitis; if the right moment is neglected enucleation may later be necessary.

To prevent increase of ocular tension pilocarpine and eserine should be used directly there is any sign of increased tension, and sometimes puncture, or if this is not sufficient an iridectomy may be required. If this treatment does not reduce the tension permanently, or at least for some time, extraction of the dislocated lens must be undertaken.

If there is a congenital or acquired relaxation of the zonula and the lens, more or less reduced and transparent, lies in approximately normal position in a hollow, the chief danger will be spontaneous dislocation of the lens into the anterior chamber. This danger may be prevented by warning the patient against all movements in which gravity would cause the lens to fall forwards by its own weight, as in stooping forwards. Moreover it is advisable to use myotics to keep the sphincter so well contracted that the transverse diameter of the pupil is considerably less than that of the lens. In most cases one or two drops of a one to two per cent. solution of pilocarpine twice daily is enough.

Uveal disease may appear in the form of circulatory disturbances and inflammations, being caused either by extension of disease or injury of the cornea or sclerotic, or it may be the result of some infective or general disease.

Further it may be the seat of tumours, or may be affected with displacements or disturbances in innervation. Prophylaxis for uveal disease, so far as such is possible, has already been considered under corneal ulcers and injuries.

For infective and general diseases as a cause of circulatory disturbances and inflammations reference should be made to the sections on scurvy, syphilis, tuberculosis, leprosy, relapsing fever, typhoid, malaria, cerebro-spinal meningitis and acute skin diseases, and also on anaemia, gout, diabetes, obesity, chronic nephritis and atheroma.

General prophylactic measures are absolute rest and avoidance of glaring light.

But this avoidance of glaring light must not be pushed too far, and the patient kept in dark rooms; it is only necessary to see that the light never exceeds that of ordinary diffuse daylight. The wearing of smoked glasses when out of doors, and keeping the sun rays out by yellowish grey blinds, is sufficient in most cases.

Disturbances of innervation will be considered under the prevention of functional disturbances. For tumours the ordinary rules of surgery hold good: the earliest possible removal of the tumour for the sake of the general health, and this means removal of the eyeball.

There is no prophylaxis for displacement of the uveal tract. In uveal disease we have then to deal rather with the prophylaxis of the consequences of the disease than with prophylaxis of the disease itself; and there are two chief forms of disease which permit of prophylactic interference: occlusion of the pupil after iritis and iridocyclitis, and sympathetic iridocyclitis. The former, so long as it lasts, exposes the eye to the danger of the development of acute increase of tension. In occlusion of the pupil, and when the vision is good, iridectomy is urgently indicated as a prophylactic. It will have to be done some time or other, and for the patient's sake it is better to undertake the operation while the eye is still free from irritation and the internal pressure normal, because the wound heals then much more easily and quickly.

Iridocyclitis, particularly when it is the result of some

injury, is very apt to cause an attack of sympathetic disease of the other eye. If the eye first attacked or injured is blind, it is advisable under all circumstances to enucleate it. Evisceration of the eyeball and neurectomy of the optic nerve have been proposed instead of enucleation, but its prophylactic value is not absolutely certain. If there is still some power of vision in the diseased eye we should postpone enucleation, and carefully watch the other eye. Above all the range of accommodation of the healthy eye and the pupil reaction should be tested frequently, because a removal of the near point and retardation of pupillary reaction are often the first signs of a threatening sympathetic inflammation. Moreover any photophobia, however slight, or injection must be noticed.

When sympathetic inflammation has set in it should be well considered whether enucleation of the eye first diseased should be undertaken as a prophylactic. If this eye still has sufficient power of vision to enable the patient to get about by himself, enucleation should not be done. Its effect after sympathetic inflammation has set in is extremely uncertain; the second diseased eye is nevertheless destroyed, almost without exception, while a cessation of the process in the eye first affected is not uncommon.

If on the other hand the eye first affected is completely or almost completely blind, enucleation should under any circumstances be performed.

Phthisis bulbi is always the result of injury or of uveal disease. The forms which follow upon suppuration of the cornea may in the main be ascribed to involvement of the uveal tract in the disease. Enucleation is upon the whole to be recommended, because every such eyeball carries with it to some extent the danger of sympathetic disease. The only exception would be where the eye is absolutely free from irritation and pain. But if there is constant or intermittent irritation, either much or little, or if it is tender or even painful, then enucleation must be performed under all circumstances.

In the different forms of primary glaucoma it is difficult to separate prophylaxis and treatment; for all treatment

of glaucoma, whether it be an acute or subacute or chronic glaucoma, is essentially prophylactic, because in most cases the changes which have already taken place cannot be undone, and the chief object of treatment is to delay the progress of the disease.

The following strictly prophylactic measures have to be considered in acute and subacute glaucoma: If the patient comes for treatment during the so-called prodromal stage, before the typical attack develops, he must be told to avoid all strong emotions and errors in diet. He ought not to overload the stomach with heavy meals, yet ought not to allow too long intervals between meals, and thus become very hungry: frequent meals, and little at a time, are best. Locally, the use of weak solutions of pilocarpine is to be recommended, a drop of a half per cent. solution in the evening before going to bed is best. The same course should be adopted when an attack of glaucoma has been cut short by treatment, because even the most successful iridectomy will not protect with absolute certainty against relapses.

For simple chronic glaucoma there is no prophylaxis apart from treatment, and this is therefore not considered here; and this applies also to congenital hydrophthalmos.

Some think that inadequate correction of hypermetropia, astigmatism and presbyopia is responsible for the development of glaucoma; others again regard nasal affections as possible causes. If we accept this view there is naturally a wider field for the prophylaxis of glaucoma.

The prevention of secondary glaucoma was described under the diseases of the cornea, lens and uveal tract, which give rise to it.

Organic diseases of the retina and optic nerve are still less amenable to direct prophylaxis than are the forms of disease hitherto described. This arises from the nature of the circumstances under which these diseases, as well as those of the uveal tract, arise, for they never arise by themselves, but only as the result of some other disease or injury of the eye, or of some general disturbance; and this is probably true even in cases where the most thorough

examination does not determine its place of origin. We shall here consider the chief causes of such disease. Wherever prophylaxis seems possible particulars will be given under the original disease of the eye or the general disease. This section will deal only with organic diseases of the retina. Those disorders which do not cause any structural change in the retina, that is to say functional disorders of the retina and optic nerve, will be dealt with in the section on the prophylaxis of functional disease. Alterations in the circulation in the retina are caused by general circulatory disturbances which arise from heart disease, aneurisms of the aorta and of the carotid, or from compression of the large vessels going to the head by tumours. They are also seen in anaemia, chlorosis and exophthalmic goitre. The most important sign is arterial pulsation. If this sign be found it should be remembered that one of the above named diseases may be present. The only local eye disease in which arterial pulsation is present is glaucoma; but the symptom does not appear till the other signs of glaucoma are fairly well marked, and it is therefore of no prophylactic significance.

Constitutional diseases of the retina, which mostly appear as a diffuse retinitis with haemorrhages, may be caused by acute anaemia from sudden and great haemorrhage; it is also met with in chronic anaemia, secondary anaemia, pernicious anaemia, leucaemia, malaria, peliosis rheumatica, purpura and diabetes, and in malnutrition and scurvy; in the last two it is often associated with xerosis and night blindness. Infections and poisons are also very important in the aetiology of retinal disease. Septicaemia causes a retinitis which, as in the case of erysipelas, assumes the form of a peri- or endovasculitis. The orbital vessels may be extensively affected, so that exophthalmos is produced.

Syphilis and tuberculosis are among the most frequent causes of inflammation of the retina.

Among "intoxications" the chief are phosphorus poisoning, uraemia and extensive burns of the skin.

Emboli and thrombosis and also retinal haemorrhages follow upon valvular heart disease, leucaemia, pernicious anaemia

and diabetes. Atheroma of the vessels may cause retinal aneurism.

Marriages between near relatives have been followed by retinitis pigmentosa in the children.

The only retinal diseases which can to some extent be prevented by treatment are albuminuric retinitis, especially in the nephritis of pregnancy, and detachment of the retina.

The prophylaxis of albuminuric retinitis will be given under general diseases, so far as it relates to the eyes. Patients who are predisposed to detachment of the retina, or who have already a partial detachment of the retina, must be emphatically told to avoid all physical exertion which would send the blood to the head, and stooping, and they should give up all near work or use the eyes as little as possible for near work.

With regard to tumours of the retina which commonly appear in children in the form of glioma, it should be borne in mind that they show a great tendency to rapid growth and to extension to the optic nerve and brain, and enucleation as early as possible is therefore urgently indicated. At the operation one should, for prophylactic reasons, also remove as large a piece as possible of the optic nerve, and if microscopic examination of the central extremity of the excised optic nerve arouses any suspicions evisceration of the orbit should be performed at once.

What has been said about retinal disease applies also to disease of the optic nerve. Optic neuritis is often a sign of compression of the brain, and we may have to consider the question of trephining the skull as a prophylactic, to prevent total loss of sight during the rest of the patient's life, which is generally short.

Prophylaxis for a neuritis which is the result of a disease of the orbit has already been described.

Inflammation of the optic nerve at its ocular end or in its course (retrobulbar neuritis) occurs in meningitis, in infections and poisons, in pachymeningitis, cerebral softening, colds, and also in diabetes and atheroma.

The infective diseases which have to be considered are

chiefly tuberculosis, syphilis, diphtheria, the acute exanthemata, pneumonia and beri-beri. The poisons are alcohol, nicotine and lead.

Optic atrophy is the result of pressure at the optic foramen or in the orbit, or it may be due to locomotor ataxia or disseminated sclerosis, when it is not the result of inflammatory disease of the optic nerve. It has also been observed after severe haemorrhage.

It is self evident that the prevention of these diseases is impossible, except in the case of poisons. This is true also for diseases of the optic chiasma and tract and for disorders of the cerebral optic centres.

The prophylaxis of disease of the muscles of the eye will be given under functional disturbances and under general diseases.

(*b*) *Prophylaxis of Functional Disorders*

Functional disorders may be due to abnormalities in refraction, in accommodation, in muscular power, and in the various functions of the retina—that is, the form sense, light sense, and colour sense, both of the central and peripheral parts of the retina.

For the emmetropic eye no other prophylaxis is required beyond the general prophylaxis already described. Neglect to correct hypermetropia may be the cause of confused vision, of a lack of perseverance in work, hyperaemia of the conjunctiva with its consequences, spasm of accommodation, or supraorbital neuralgia moreover, it may cause convergent strabismus, and in rare cases divergent strabismus. It may also give rise to tonic and clonic spasm of the orbicularis muscle. Cataract and glaucoma are also said to be possible consequences. The only prophylaxis required is the choice of suitable spectacles. If the degree of hypermetropia found by examination (the acuteness of vision being normal) does not explain the severity of the symptoms complained of, it should be remembered that there may in addition be some functional neurosis, and that a relatively large proportion of the hypermetropia remains latent in consequence of spasm of accommodation. Atropine should here be used in order to determine the correct glasses.

It is then well, at least at first, to order glasses which are 0·5 to 1·0 D. weaker than those required to correct the amount of hypermetropia found when the eye was under atropine.

Here we must also draw attention to a point upon which sufficient stress is often not laid, namely the way in which the spectacles are made to fit. However carefully the glasses have been selected they will not fulfil their object unless they are properly centred. With glasses of higher powers the effect will be quite different according as the visual axis passes through the edge of the glass or through the middle.

In prescribing spectacles we should therefore carefully state the distance between the pupils and the height of the bridge of the spectacles relatively to the horizontal diameter, and the position of the latter relatively to the plane of the glasses. For prominent eyes it may have to be placed posterior to the plane of the glasses, while for eyes which are deeply set back it may have to be brought well forward; for a depressed nose the height of the bridge may have to be negative and lie below the horizontal diameter of the glasses.

It should be taken into consideration too for what purpose the glasses are required, whether for near work or for distance. If they are chiefly for distance the frame should be selected so that the wearer looks directly through the middle of each glass; if for near work, the slightly lowered visual line should pass through the centre.

The same results which may follow the non-correction or imperfect correction of hypermetropia may also appear in astigmatism.

To prevent these harmful results glasses to correct fully the defects should be prescribed for simple hypermetropic, compound hypermetropic and mixed astigmatism. For simple myopic astigmatism it is best for distant vision to make the myopic meridian emmetropic by a concave cylinder, but for near vision to make the emmetropic meridian artificially short sighted by a convex cylinder adapted to the dioptric value of the myopic meridian, in

order by these means to prevent accommodation efforts for near work. In mixed myopic astigmatism a concave cylinder should be ordered for near work, which makes the weaker refracting meridian equal to the stronger refracting meridian; whether then for distance the simple myopia should be fully or only partially corrected by addition of suitable spherical concave glasses will depend upon various points which will be considered under the prophylaxis of myopia. Myopia offers the widest scope for prophylaxis of all the functional anomalies.

Myopia is always the expression of a want of a proper relation between the length of the axis of the eyeball and the refractive power of the dioptric system, in the sense that the refractive power is too great compared with the length of the bulb. The want of proper relation arises either when the dioptric system has a normal refractive power but the bulb axis is too long, or when the length of the bulb is normal but the refractive power is too great. Both forms may be congenital or acquired.

In connexion with prophylaxis acquired increase in length of the eyeball is of special interest. This form of myopia will therefore first be described.

It is beyond the scope of this work to enter into the various theories about the development of myopia, but one statement is common to all these theories: the predisposition to the development of myopia is always congenital. One part, and probably the chief part, of this congenital disposition is an abnormal diminution in the capacity of the sclerotic to resist the normal internal tension of the eye.

In rare cases, from the very first year of life up to the death of the individual and independently of external conditions, this increase of length of the bulb regularly develops by a stretching chiefly of the posterior part of the bulb, with its attendant changes in the choroid and retina. This is the worst form of progressive myopia.

In by far the greater number of cases the development of myopia commences the moment the individual begins to use his eye for near objects; it is the result of near work.

Near work requires efforts for convergence and the tension

of accommodation. By the effort to converge an unequal pressure of the extrinsic muscles upon the eye is produced. By the tension of the muscle of accommodation the choroid is drawn forwards along its whole circumference, or stretched, and this must for purely mechanical reasons exercise a certain compression upon the vitreous body, although we have not yet succeeded in proving experimentally that there is a rise of pressure within the vitreous which this compression must theoretically produce and which is needed to explain the clinical phenomena.

In these cases where there is a congenital abnormal distensibility or congenital lack of elasticity of the sclerotic, the sclerotic is unable for two reasons to resist the tendency of the vitreous body to pass backwards under the action of this compression—on the one hand because the sclerotic does not offer sufficient resistance, and on the other hand because it does not retract well after having been stretched. Thus there arises a permanent increase in length of the axis of the globe. The result of this backward yielding of the sclerotic is to deprive the choroid more and more of the support which should protect it against permanent distension by the effort of accommodation. The first result of this is that the edge of the choroid which surrounds the optic nerve externally is drawn away. The more the eyeball is distended backwards the more marked will this retraction become. As the process goes on the other parts of the edge of the choroid which form a hole for the passage of the optic nerve will be drawn away from the nerve, and a circular staphyloma is formed. In its further course that part of the choroid behind the posterior pole is also drawn away, and "distension atrophy" of the fundus results. In the worst cases the next result is separation of the retina. The longer and more permanently such an eye makes efforts of accommodation, that is, the more near work such an individual does, the more rapidly and the more extensively will the changes be developed which have just been described.

In the large majority of cases it is the effort of accommodation and of convergence alone which produces these

results without any continued and useless contraction of the ciliary muscle after the near work has been done. This useless contraction of the ciliary muscle, "spasm of accommodation," is not now by most writers considered necessary for the development of myopia; some indeed maintain that it has nothing whatever to do with it.

Clinical facts however make me think that in a number of cases of acquired myopia spasm of accommodation is an important factor during periods when the myopia progresses. I am far from saying that the spasm of accommodation is in itself a cause of myopia, because we know that an eye may for a long period of time have ciliary spasm without becoming short sighted; but when it is added to a predisposition to myopia then it will tend to hasten the progress of myopia.

Eye work is necessarily, for physiological reasons, associated with hyperaemia. In a normal eye this hyperaemia ceases physiologically directly the work is finished, but it remains in an eye which is predisposed to myopia. This necessarily causes a disturbance of nutrition. How far this disturbance in nutrition completes the vicious circle and again increases the distensibility of the coats of the eyes or reduces their elasticity has not yet been fully explained.

The degree of myopia and the length of time during which it develops is very different with different individuals. From clinical experience we distinguish three groups, omitting cases of congenital progressive myopia mentioned before—

1. In the first group the myopia progresses till the distant point has moved to the ordinary working distance for that individual, and the further progress of the myopia then ceases by itself.

2. In the second group the myopia is progressive till the development ceases, that is till about the twentieth year of life and then ceases to progress.

3. In the third group myopia is progressive as in the congenital progressive form till the end of life.

In groups 2 and 3 the period of puberty seems to be

the most dangerous for increase of the myopia, particularly in girls.

In connexion with prophylaxis we have first to consider whether the tendency to development of short sight is or is not accompanied by any purposeless effort of accommodation or spasm of accommodation. In the former case prophylaxis must be therapeutic and hygienic so that in addition to suitable rules about near work, the effort of accommodation may be removed from time to time by a shorter or longer use of atropine while there is any tendency to progressive myopia.

In the large majority of cases on the other hand there exists no reason for a prolonged treatment with atropine. In the third group of cases mentioned above the action of atropine may be injurious because of the rise of intra-ocular pressure, however slight, which it may produce even in an eye not predisposed to glaucoma. In these myopic patients hygienic measures are alone applicable. The general rules to be observed to prevent shortsightedness are summarized by Fick as follows—

1. For near work (reading, writing and sewing) the distance of the eye from the object should be at least 13 inches, and the head must be kept straight and the visual plane be very little lowered.

2. The external conditions should be such that the whole functional capacity of the eye is not called forth, so that for example a diminution in the amount of light or in the size of the letters is still possible and will not make reading difficult or impossible. Work up to the maximum limit of functional capacity is a strain upon any organ and only possible for a short time.

3. Near work should not be continued for long periods at a time.

The measures to be adopted that the distance between the eye and the object may be right will be found under the general prophylaxis of eye diseases in the section "How we ought to work" (page 649). Mechanical means to maintain the body in the upright position are specially indicated for persons who have the habit of gradually

bringing their eyes closer and closer to their work. Many different forms of apparatus have been devised: head supports, chin supports, breast supports, and shoulder girdles to draw the body backwards, as well as a jacket apparatus. The form of apparatus which seems to me most practical I devised for my own son because the various forms of apparatus I tried did not answer the purpose. It consists of a transverse bar which is movable in the vertical plane and equal in length to the breadth of the chest of the patient, the breadth being measured from the tip of one acromion to the other. At each of the two extremities of this transverse bar there is a bar two to four inches in length at right angles to the transverse bar and resting against the sides of the body, and each of these side bars ends in a pad. The writer sits so that the two shoulders rest against the pads. The more the scholar rests against the pads, the more will the breast be distended, because it lies perfectly free between the two pads. It becomes therefore impossible to shift the body sideways, because directly the child moves to one side the instrument moves forward on to the chest and presses the body back, and thus increases the distance between the eye and the work so that the child will of itself resume again the correct position. The position of the book and the slant of the writing are also of great importance for the correct position of the body. Hermann Cohn remarks that with a badly constructed desk the child is compelled to sit badly, but that it can sit badly even in the best constructed desk. It is best in order to compel the body to keep upright that the book should lie in exactly the middle and that the writing should be upright. This combination of the position of the book and upright writing will completely prevent the favourite attitude of the child of sinking on the left, because the child can only write by moving the upper part of the body towards the right for each line he writes for a distance equal to the length of the line written. Writing is not so easy in this position of the book and with this slope of the letters as it is when the book and the writing are

slanting. But the hygienic value of this method of writing is so great that the longer time required to learn to write quickly is of comparatively trivial importance.

The connexion between the amount of light upon the work and prophylaxis will be found already given in the general section, and anything else to be said about it belongs to hygiene.

We will merely point out that reading in twilight and while riding is particularly bad for eyes predisposed to myopia.

The time devoted to near work has also to be considered in prophylaxis. The general rules about this so far as concerns schools are given by Fick as follows—

"Attendance at school should not commence till the child is seven years old. In the first year of school life instruction should not exceed sixteen to eighteen hours a week, and should be divided up into periods of not more than two hours. Between the two hours of any one period there should be a rest of a quarter of an hour. In giving instruction a distinction must be drawn between near work (reading, drawing and writing), and other work (learning by heart, gymnastic exercises, singing); near work must never continue for more than half an hour at a time. The number of hours may be gradually increased during the remaining school years. But there should always be a quarter of an hour's interval at the end of every hour, half an hour's interval at the end of every two hours, and a regular alternation between near work and other work. Never, not even in the highest class, may the number of school hours exceed thirty-two per week, and the number of hours of homework exceed fourteen, that is a weekly total of forty-six hours must not be exceeded."

It is obvious that these rules about work must be doubly strictly observed by individuals who show a tendency to become myopic or who are already more or less myopic.

We should take care too that so long as there is any tendency for the myopia to progress, shortsighted individuals should if possible work only in good daylight.

For myopic patients whose myopia does not progress

after the distant point has moved into the ordinary working distance or after they are twenty years of age, special prophylaxis for short sight is no longer required but the general prophylactic measures are alone needed.

The case is different when the myopia continues to progress. These patients should restrict the amount of near work for the rest of their lives and carry out the rules given above about the length of time they work and the size of the work.

These precautions are the more necessary because such eyes are specially predisposed to retinal and choroidal haemorrhages and to separation of the retina.

In the case of such individuals their short sight will have to be taken into consideration in the choice of an occupation. It is the easier to be guided by this consideration in choosing a vocation because in this group of cases there is already a high degree of myopia at the age of twelve or fourteen years, and the ophthalmoscopic examination shows the presence of a large staphyloma already at this age.

Heredity is very important in connexion with myopia, and the children of shortsighted parents should therefore be subjected to strict hygienic prophylaxis even before they show any signs of short sight. That form of short sight in which the length of the eyeball is normal and the lens has too high a refractive power relatively to the length of the bulb may have for its cause a too great refractive power of the lens which is congenital, or a swelling of the transparent lens in consequence of commencing cataract, or it may result from a tonic ciliary spasm. For the first two causes there is no prophylaxis; that for the last named will be described under spasm of accommodation. In all forms of short sight the selection of the correct glasses is a very important prophylactic measure. Opinions about this matter among ophthalmic surgeons are no longer so unanimous as formerly. A small number are of opinion that it is best when the myopia does not exceed 6 to 8 dioptres to correct the myopia fully both for distance and for near work, in

order thus to make the myopic eye equal to the emmetropic eye in convergence and accommodation.

These authorities deny that the effort of accommodation has any influence upon the progress of myopia.

But, as is evident from what I have already said, this is not the opinion which I hold. It appears to me to be contrary to all statistical and clinical observations, and the deductions of the upholders of full correction have not yet convinced me that my standpoint, which is also the standpoint of the majority of ophthalmologists, is wrong; and therefore in prescribing glasses I go upon the following principles. So far as prophylaxis is concerned we must first determine whether the myopia is greater or less than 6 or 7 dioptres. Then we must determine whether the case is one of pure myopia or of myopia increased apparently by spasm of accommodation or wholly simulated by it.

For myopia under 6–7 D. the following rules apply in prescribing glasses—

For distance full correction may be ordered.

For near work however glasses which fully correct the myopia must never be prescribed. The myopia may only be corrected so far that the distant point is at a comfortable working distance, that is 12 to 15 inches distant.

A distant point of 13 inches corresponds to a myopia of 3 dioptres.

If the myopia is less than 3 dioptres, that is if the distant point is greater than 13 inches, then the myopic eye should work without glasses. If the myopia is greater than 3 dioptres, the myopic person should be given glasses for near work which will reduce his myopia to 3 dioptres.

In this way the effort of accommodation is completely removed and an evil has thereby been eliminated which might otherwise cause the myopia to progress.

To give examples: A patient with a myopia of 2 D. would be ordered spectacles or eyeglasses of 2 D. for distance and be told to remove these glasses for all near work. His far point is at 20 inches; he is therefore able to see clearly without correction everything which lies

nearer to the eye than 21 inches. If, on the other hand, his myopia is 5 D., the far point is at 8 inches. If such a patient were to work without glasses he would be obliged to bend his body forward to work and would have to converge too strongly relatively in order to get binocular vision. We should therefore order the patient a glass for near work which is equal to the difference between 3 D. and 5 D., that is we should order glasses of 2 D. for near work.

If the myopia is different for the two eyes but neither eye exceeds 6 or 7 D., we should correct each eye separately according to the rules above laid down. As to the selection of spectacle frames see what has been said on page 684.

Thus for the lower and medium degrees of myopia general rules can be laid down in the ordering of glasses, but this is impossible for the higher degrees of myopia which exceed 6 or 8 D.; here we must individualize strictly.

Two factors have to be considered in individualizing: the greater or less tendency to progression of the myopia and the subjective sensations of the patient. Even adherents of the full correction view allow that in the higher degrees of myopia we meet not seldom with a decided reluctance to wear fully correcting glasses, which cannot be overcome by habit.

If with a high degree of myopia there is no special tendency to progression, and this can be determined with tolerable certainty by the condition of the fundus, we may try in ordering glasses to follow the same rules as for slighter degrees of myopia. But if the patient says that the glasses are uncomfortable, particularly for near work, we should give way to him and order weaker lenses. We find out from the patient the distance which he feels to be most comfortable for work, and prescribe concave glasses which will transfer the far point to that distance.

In deciding too upon glasses for distance we should not insist upon fully correcting the myopia but give the patient those glasses which he himself feels to be most comfortable. Stronger glasses than 12 to 14 D. are but seldom given for permanent use for distance. Patients who cannot bear the

full correction for distance should have eyeglasses to wear in addition, so that they may be able at least temporarily to get perfect vision.

If the ophthalmoscopic examination or prolonged observation shows that there is a great tendency to relatively quick increase of the myopia, we should then in these cases of high myopia not fully correct the myopia for distant vision, even though the patient does not find the strong glass uncomfortable. For these patients it is best if for ordinary use they have a lens which removes the far point to 6 or 8 inches, that is reduces their myopia to 4 to 7 D., and then use eyeglasses in addition for distance.

In general we may say that the higher the myopia the greater must be that part of the myopia which remains uncorrected.

We must here utter a warning against the habit of wearing an eyeglass which is a favourite habit among officers. Apart from the fact that they may cause spasm of the muscles of the eyelids and face, the exclusive use of one eye for distant vision is injurious. The habit of binocular vision too is lost.

Functional disturbance in the reaction of the pupils is significant in prophylaxis only in so far as its presence leads to the adoption of preventive measures against possible disease of the nervous system, even though the examination does not show what is the cause of the disturbance. It is therefore a matter of no concern as to which form of disturbance of pupil reaction is present.

Disturbances in the activity of accommodation may take the form of spasm, of paralysis or of weakness. Spasm of accommodation may be the expression of a purely local functional disturbance, the result of too prolonged or of too great efforts at accommodation, or it may appear as the result of functional neurosis. Prophylaxis for the latter, so far as any is required, will be given under neuroses.

Accommodation spasm may appear in two forms: a temporary spasm or a continuous spasm. Patients with temporary spasm of accommodation complain chiefly that after a long period of near work they cannot for a longer

or shorter time see well at a distance, and that power of clear distant vision returns gradually only after a time. With this sign there is generally associated a feeling of pressure and of dragging in the forehead, which increases the longer the near work is continued and disappears again when improvement in distant vision sets in.

In the second form the spasm is permanent. The characteristic complaint of the patient then is that he has become shortsighted in a relatively short space of time, or that his former short sight has quickly increased.

There is thus in both cases temporarily an apparent myopia caused by too great refraction by the lens. This may simulate myopia even up to 7 D. If the accommodation spasm affects one eye only, which is by the length of the eyeball predisposed to myopia, it may possibly accelerate the progress of these changes, and the high myopia which was at first merely functional may become a higher myopia and be based upon anatomical changes.

For the prevention of spasm of the accommodation the same measures are available as for the prophylaxis of myopia. In these cases the occasional use of atropine is of great value.

We must distinguish from spasm of the accommodation those forms of purposeless ciliary contraction which arise because the ciliary muscle has a certain tendency to contract beyond what is required. A clinical characteristic of these cases is that the patient complains that the longer he continues his near work the closer must he bring his eyes to the work. In these cases there is a want of agreement between the sight test and the objective determination of the refraction; that is the accommodation spasm relaxes in the dark room. This is because too much action of the ciliary muscle is called forth by the sight testing, that is by the effort to see clearly, and it disappears again naturally directly there is no longer any reason for the action of the muscle. In this form it is for prophylactic reasons most important to urge the patient not to give way to it; and whenever he feels the need of getting his eyes closer to his work he should cease work for a few minutes and look into

the distance. It is in these cases that some mechanical support to keep the patient up or the Bâle spectacles already mentioned are very useful, because the patient is thereby prevented from unconsciously yielding to the desire to bring his head close to his work. To this category belong also those cases described by Peters among others, in which children seem to be shortsighted when glasses are placed before their eyes, but finally are found to have normal vision through plain glasses, though without these plain glasses they say they cannot see clearly. There is a unanimous opinion among observers that this is no simulation, and the explanation of these cases is probably that in consequence of some mental process a disproportionate effort of accommodation is made when the eye is not covered by a glass, and that this auto-suggestion ceases as soon as a plain glass is placed before the eye.

In addition to suggestion treatment I have found it useful as a prophylactic to order a plain glass and sometimes even a weak convex glass, because auto-suggestion is thereby removed and the apparatus for accommodation returns gradually to its normal activity.

Paralysis of accommodation, when not caused by drugs applied locally, is always the result of a general disturbance. It may be due to poisoning by atropine and similar alkaloids and to poisoning by fungi, deadly nightshade and by sausages (botulism). Paralysis of accommodation may also be a sequela of diphtheria, and may occur as unilateral or as bilateral paralysis in cerebral syphilis and (rarely) in hysteria. Prophylaxis is only of value here in the same way as in disturbances of the pupil reaction. Weakness of accommodation may occur in two forms—

1. A true weakness of the ciliary muscle, the lens still retaining its elasticity.

2. An apparent weakness due to rigidity of the lens.

True weakness is the earliest local sign of a threatening sympathetic ophthalmia and is in this case a valuable symptom in regard to prophylaxis.

True weakness of accommodation may also be the result of debilitating general disease and of debilitating physiological

conditions (such as menstruation and pregnancy), and of hysteria and neurasthenia. When the weakness has resulted from some general organic disease it is necessary, as a prophylactic, to reduce near work as much as possible, limiting it to very short periods, at most ten to fifteen minutes, and alternating these working periods with periods of rest of at least the same length of time. The time during which the individual can read without feeling uncomfortable is an indication of the length of time that near work may be permitted. When there is marked weakness near work must be forbidden absolutely. On the contrary when the weakness of accommodation is caused by neurasthenia and hysteria, it is of prophylactic value to urge the patient to do some near work in order that this feeling of weakness may not become fixed. Suitable "waking suggestion" is the best prophylaxis in these cases, in addition to treatment of the general cause. Obviously refractive errors if present must be properly corrected.

The weakness of accommodation which is the result of rigidity of the lens appears as the well known presbyopia of advanced life. Here it is important as a prophylactic not to delay prescribing correcting spectacles until more troublesome symptoms arise; that is to say spectacles should be ordered as soon as possible. If this is not done, particularly in those of nervous disposition, troubles from accommodative asthenopia will arise, similar to although not so marked as those described as a consequence of uncorrected hypermetropia. The same remarks apply to the necessity for ordering stronger glasses as occasion arises. This is the more important since, in the opinion of some ophthalmologists, an uncorrected or insufficiently corrected presbyopia tends to produce cataract and glaucoma.

Functional disturbances in connexion with the activity of the retina appear in the form of hyperaesthesia and hypaesthesia and anaesthesia. These terms include all functional disorders of the retina, because photophobia is hyperaesthesia; amblyopia, disorders of the sense of light, of the sense of colour, and disorders of the peripheral visual powers, and night blindness, fall under hypaesthesia and anaesthesia.

These disorders are for the most part either congenital or the result of organic disease of some part of the eye, or the result of general organic and functional disturbances. Important among the functional disturbances are neurasthenia and hysteria, and disturbances of every kind connected with the generative organs. Details about prophylaxis, so far as this is possible, will be found in those special chapters.

Here we shall mention only two forms of functional disturbance of the retina for which prophylaxis is admissible, but only up to a certain degree in the second form. These are the slighter forms of dazzling by light and temporary scotoma. The prophylaxis of the severer forms of dazzling has already been given under general prophylaxis. The slighter forms of dazzling are characterized by after images of shorter or longer duration after looking at circumscribed objects which are too strongly illuminated, or by a temporary diminution of the retinal sensibility for normal illumination, as is the case for example when one goes into the shade or into a house after walking along a sunny road for a long time. This slight form of dazzling may also appear when one works with the source of light, either window light or artificial light, streaming directly into the eye; moreover these slight forms of dazzling may arise when the work is directly played upon by the sun.

The result of these milder forms of dazzling may be, in addition to the above named temporary diminution in sensibility under normal illumination, a hyperaemic condition of the eye and supraorbital neuralgia.

The prophylaxis is very simple. To prevent dazzling by the sun out of doors one should use a sunshade, or wear lightly smoked glasses if obliged to remain out in the sun for a long time; and in working one should sit, as was pointed out under general prophylaxis, in such a position that the source of light does not send its rays into the eyes, and that the sun does not shine upon the work.

In a few cases very troublesome symptoms of dazzling appear also when the side light enters the eye; and here protective flaps fastened to the sides of the spectacles are

useful. For these cases "marginal protective spectacles" have been devised by Schmidt-Rimpler.

As to the cause of transient scotoma there are very different opinions. This is not the place to enter into the various hypotheses, and I shall therefore avoid mentioning transient scotoma under general disorders which are stated to be a predisposing cause of it.

As to prophylaxis we must find out the exciting cause. In a number of cases transient scotoma comes on when there is a sensation of intense hunger. The prophylaxis here is never to allow the stomach to be quite empty, but to eat a little from time to time between meals, be it only a piece of bread or chocolate or biscuit. In other cases transient scotoma is the result of acute abuse of alcohol and tobacco, or occurs after debilitating excesses, especially sexual. Here prophylaxis is very simple, namely moderation.

For forms of transient scotoma which arise without any evident cause there is naturally no prophylaxis.

Disturbances in the function of the ocular muscles occur as strabismus, paresis, paralysis and spasm.

Strabismus is the result of errors of refraction and of great difference in the acuteness of vision of the two eyes, whether these be congenital or acquired. For the latter there is not much that can be done by prophylaxis. But prophylaxis is possible in strabismus when it is caused by anomalies of refraction if the measures be adopted in time.

Convergent strabismus is mostly the result of a more or less high degree of hypermetropia, and develops generally between the second and fourth years of life, at the time when the child begins energetically to accommodate. If the patient is brought to the physician at this period when the squinting is as yet only periodical, its further progress may be prevented by ordering suitable convex glasses. In ordering the glasses it is best to relax accommodation by atropine, and then estimate the refraction by retinoscopy, because it is very difficult to apply visual tests at this age. If for any reason spectacles cannot be ordered, we must at least try to teach the little patient to use his eyes equally, in order later when curative, that is operative, measures are adopted, to

make it easier for him to acquire binocular vision. This is best done by covering the non-squinting eye every morning and evening for half an hour in order to make the squinting eye act for a time at least.

Divergent strabismus when due to an error of refraction is generally the result of high myopia. Here too the best prophylaxis is the wearing of suitable spectacles.

Weakness of the ocular muscles may result either from an error of refraction, mostly myopia, or from general diseases. Among the latter are debilitating diseases and functional neuroses. The prophylaxis of these will be given under the general diseases.

The prophylaxis of the former cannot really be separated from treatment, but will be considered here because with the removal of this weakness of the internal recti in myopia there is associated a prophylaxis against the unfavourable influence of this muscular activity upon the progress of myopia. In these cases it is of prophylactic value to reduce or remove the activity of the internal recti by using a prism in the spectacles, because when the contraction of the internal recti is thus reduced, the antagonistic tension of the stretched external recti is also removed. The principles to be followed in this belong to therapeutics in the narrower sense, and will be found in text books upon ophthalmology.

For paralysis of the ocular muscles, whatever be the cause, there is only one prophylactic measure, the affected eye should be prevented from seeing by placing in front of it a nontransparent glass. If this is not done the endeavour to get single vision will on the one hand produce spasm of the antagonists, and thus favour the development of a squint, and on the other hand the patient is obliged to hold the head on one side in order to fuse the images, and this may cause spasm of the neck muscles.

Spasmodic conditions of the ocular muscles are, like paralysis, either the result of general disturbances and will be mentioned under that heading or are the result of anomalies of refraction. If examination shows that the refraction is abnormal, especially if hypermetropia is caus-

ing the spasm, then therapeutics and prophylaxis are one and the same, namely correction of the refraction.

Nystagmus can only be influenced by prophylaxis when it is acquired. Details will be found in the section on trade diseases (eye disease in miners).

(c) *Prophylaxis of Diseases and Functional Disturbances which arise in the Course of General Diseases*

Under special prophylaxis we had occasion to mention all the diseases of the eye in the preceding chapter, but this separate section will be devoted to the connexion between general disease and disease of the eye, because one and the same general disease may often produce very different diseases of the eye, and in order to take a rapid survey of those eye diseases which may be prevented it seems necessary to group the possible eye diseases.

It is obvious that all these eye diseases cannot be prevented; indeed one may even say without exaggeration that the number of these preventible diseases is comparatively small. But if we are prepared for the possible development of an eye disease during the course of a general disease, we shall at least be in a better position successfully to prevent its further progress than we should be if the complication came upon us by surprise and was therefore, in its initial stage, overlooked or disregarded. A correct prognosis is in these cases not seldom the best prophylaxis.

Those diseases which admit of special prophylaxis with regard to eye affections will be described in detail. In the case of diseases in which prophylaxis of the eye disease is identical with prophylaxis of the general disease we shall refer the reader to that special section of the book. In cases where prophylaxis is not possible we shall merely make a reference to the eye diseases which may arise.

The fact must here be specially emphasized that the eye affection is not seldom the first sign of a threatened general disease, and that a correct aetiological diagnosis of the eye disease often gives a valuable clue for the prophylaxis of

the general disease. Let us first consider acute infective diseases.

Measles and scarlet fever may give rise to conjunctivitis, inflammation of the cornea, fibrino-plastic cyclitis, panophthalmitis and optic neuritis. Conjunctivitis occurs almost without exception in these diseases. Often indeed conjunctivitis is the first symptom of the general disease. It is therefore important during epidemics of measles and of scarlet fever to pay greater attention to conjunctival hyperaemia and to conjunctival catarrh in children; this will often enable us to take early prophylactic measures in respect to the general disease. On the other hand the fact that almost every case of measles and scarlet fever is accompanied by conjunctivitis should not deceive us so as to make us regard every affection of the eyes in these diseases as a conjunctival catarrh. The early ordering of antiseptic eye lotions, especially of a solution of corrosive sublimate (1 in 5,000) and the use of a two per cent boric acid ointment will probably prevent many a severe complication.

So far as is known varicella never leads to any serious complication, and no special prophylaxis is therefore required.

The case is very different with variola. Pustules upon the eyelids may lead to trichiasis, to loss of the lashes and to ectropium; pustules on the conjunctiva may give rise to extensive scar tissue and deformities, and even to xerosis of the conjunctiva and the serious affections of the cornea following it. Moreover, as in the case of measles and scarlet fever, cyclitis, panophthalmitis, and optic neuritis may occur.

Recently it has been stated that the scarring by smallpox is much less severe if the patient is kept constantly in red light. If this statement is confirmed, it would seem to be of prophylactic value to keep out the daylight by red curtains or red veils. Here too it is probably of use also to order antiseptic eye lotions early.

Vaccinia may also lead to extensive distortion by scarring through pustules on the eyelids and conjunctiva. We should therefore take precautions in the case of those who

have been vaccinated, that the vaccine is not conveyed to the eyes by contact with the arms.

In facial erysipelas conjunctival irritation and inflammation of the eyelids occur almost without exception but without leaving any serious consequences. But if the process extends to the orbital cellular tissue or to Tenon's capsule the most unpleasant complications may arise. If proptosis occurs the measures already given for that condition must be adopted. The most serious result, which cannot unfortunately be prevented by prophylactic measures, is when the process extends to the optic nerve. Optic atrophy is then almost without exception the final result. The same result occurs with retinal inflammations which appear in the form of a perivasculitis and endovasculitis.

Prophylactic measures against conjunctivitis in diphtheria have already been given. Prophylaxis for the other sequelae of diphtheria, namely paralytic mydriasis, paralysis of accommodation, panophthalmitis, and optic neuritis, is identical with the prophylaxis of diphtheria. Prophylaxis is powerless against the sequelae of influenza, namely conjunctivitis, interstitial keratitis, iritis, neuritis, retrobulbar haemorrhages and panophthalmitis. Early diagnosis and early treatment are alone of avail. This is also true for rheumatism, both acute and chronic, with its sequelae, namely diseases of the uveal tract, sclerotic and optic nerve, as well as for the panophthalmitis which appear in peliosis rheumatica, epidemic parotitis and Weil's disease.

Neither can anything be done by way of prophylaxis in whooping cough with haemorrhages into the eyelids and conjunctiva, and its temporary visual disorders and blindness; nor yet in the inflammations of the orbital connective tissue and of Tenon's capsule, and in the panophthalmitis and retinal inflammations which are attributable to pyaemia, septicaemia and puerperal fever. Typhoid, typhus and cerebro-spinal meningitis may lead to iritis, cyclitis, panophthalmitis and optic neuritis; here too prophylaxis is not possible. On the other hand prophylactic measures may be of the greatest value in the conjunctivitis and keratitis which occur in these diseases when the drowsy

delirious patient does not close his eyelids, and the conjunctiva and cornea are exposed to the drying effect of the air and to the irritation of particles of dust and of organisms suspended in it. Here it is advisable frequently to smear the palpebral fissure with a two per cent. boric acid ointment and to keep the eyes covered with compresses dipped into a weak solution of corrosive sublimate.

In relapsing fever and malaria we may meet with iritis, cyclitis, retinitis and visual disturbances, especially temporary homonymous hemianopia, and these require the ordinary prophylactic measures for the general diseases.

Subacute and chronic infective diseases probably furnish the largest number of cases of eye diseases which are dependent upon general disease.

This holds good for acute malaria and also for malaria which has become chronic.

Chronic gonorrhoea leads in rare cases to extensive disease of the uveal tract. Prophylaxis here is obviously that of the gonorrhoea. Prophylaxis against the direct transference of gonorrhoea has already been mentioned. Syphilis is a cause of ostitis and periostitis, papules on the eyelids, infiltration of the tarsal cartilage, disease of the lachrymal ducts and conjunctiva, interstitial keratitis and scleritis. Moreover it leads to all kinds of diseases of the uveal tract, retinitis and optic neuritis, and when it has attacked the brain to disturbances of accommodation and muscular action. The prophylaxis is obviously that for the syphilis. It is important in all these forms of eye disease to think of a possible syphilitic origin. For in many cases the eye disease is the first sign of a general infection having occurred, and it is most important in these cases that the eye affection should lead to the adoption of an energetic general treatment in order to prevent further consequences of the infection.

The same is true of tuberculosis which may lead to the same diseases as syphilis. The differential diagnosis between syphilis and tuberculosis often presents the greatest difficulty. The difficulty is the greater because mixed infection not rarely occurs in eye disease. As to

prophylaxis, what was said about syphilis is applicable here too.

The same considerations apply also to leprosy.

Scrofulosis is best considered after these diseases, because it is mostly the result of tuberculous or syphilitic disease in the parents when not a result of unfavourable conditions of life. There is, moreover, very little to be said about it here; the main general considerations will be found in the chapter on the prophylaxis of disease in children, and the eye affections have already been dealt with in the section on organic disease of the eye.

By early treatment of diseases of the nose, throat and adjacent cavities, very many eye diseases may be prevented. Although we do not go so far as many do and attribute cyclitis, iritis, glaucoma, cataract, myopia and strabismus to nasal affections, yet there is no doubt that diseases of the nasal and pharyngeal mucous membranes may cause increase in the secretion of tears, and disease of the conjunctiva, cornea and lachrymal ducts. When the pharynx is occupied by adenoid growths or polypi, we not rarely meet with asthenopic troubles, conjunctival, accommodative as well as muscular, and supraorbital neuralgia. In rare cases optic neuritis has also been observed as a sequela of nasal disease.

Here there is great scope for prophylaxis, and early and careful treatment of these diseases is the more important in regard to diseases of the eye, because it is probably true that all these diseases must sooner or later cause one or more of these affections of the eyes, which will then be a cause of further eye disease. The same is true of diseases of the adjoining bony cavities which may by extension lead to serious disease of the orbit, and relatively frequently to optic neuritis.

In empyema of the frontal sinuses and of the antrum of Highmore, purely functional limitations of the visual field have also been observed.

Disease of the eye following tooth extraction or disease of a tooth can be most easily explained by extension of the disease by way of the antrum of Highmore.

Prophylaxis is powerless to prevent eye diseases which may follow disease of the lungs: such as herpes of the cornea, panophthalmitis and optic neuritis in pneumonia, and haemorrhage into the eyelids and conjunctiva, vitreous body and orbit in emphysema and disturbances of the pulmonary circulation.

Neither can we prevent disease of the eyes which is a consequence of disease of the heart and vascular system. We should always remember that such patients are greatly exposed to the danger of emboli and thrombosis of the optic nerve and retina, and to retinal haemorrhages. Cataract and glaucoma, as well as haemorrhage into the vitreous body, and degeneration of the retinal and choroidal vessels, also occur in circulatory disturbances and in atheroma of the vessels.

The remarks made in the introduction to this chapter apply strongly to these last named diseases, namely, that the development of the disease of the eye is often the first symptom leading to the discovery of the general disease and thus makes it possible to prevent the further progress of the general disease. This is often the case with abnormal pulsation of the retinal vessels, discovered by mere chance during the ophthalmoscopic examination of the eyes for some other purpose, possibly for some error of refraction. If such an examination reveals an arterial pulsation, or in the absence of local increase of blood pressure a venous pulse, we must always bear in mind the possibility of aortic insufficiency or of insufficiency of the tricuspid valve. An aortic aneurism may also produce arterial pulsation in the retina. But we must not forget that anaemia or chlorosis may also give rise to this symptom.

These remarks are equally applicable to eye disease which is the result of kidney disease, especially iritis and albuminuric retinitis. In these diseases, too, prophylaxis is possible, though to a more limited extent, in the sense that careful observation of the eyes of patients with renal disease makes it possible at the very first signs of eye troubles to cut them short by energetic treatment of the general disease.

When disease of the kidneys has been diagnosed the

patient should be told about the possibility of the development of retinitis so that he may seek medical advice directly the very least visual trouble arises.

With regard to nephritis and retinitis which are the result of pregnancy, reference must be made to the prophylaxis of the diseases of the genital organs.

Diseases of the digestive tract are somewhat less important. The chief eye troubles are forms of night blindness in hepatic disease and yellow vision in jaundice. Here again the eye disease is often the symptom which leads to the prevention of the further progress of the general disease. Many a case of hepatic disease might be diagnosed by a correct interpretation of the ocular symptoms and its further progress be checked. In disease of the stomach and in chronic gastric and intestinal catarrh there is weakness of accommodation and of the ocular muscles. In cholera infantum diseases due to the general weakness and to the drying of the cornea appear, and the prophylaxis is that already given for typhus.

A large number of eye affections may be caused by diabetes mellitus. The various forms of cataract and retinitis should suggest an examination of the urine. The retina is subject to a specific form of retinitis in diabetes; but sclerotitis, iritis, choroiditis and thrombosis of the central vein of the retina may also be the result of diabetes. In a case of diabetes the possibility of the development of these eye affections should be borne in mind. There is no prophylaxis against these eye affections except adequate treatment of the primary disease; but these eye affections can be influenced by energetic treatment of the primary trouble and the further progress of the disease be prevented in many cases or at least delayed. The fact is important that the development of the eye affection often leads to the recognition of the primary disease.

Homonymous hemianopia may occur in diabetes insipidus.

Anaemia and chlorosis may cause accommodative and muscular asthenopic troubles, especially when such patients do work which strains the eyes. These patients and con-

valescents after debilitating and febrile diseases should therefore be taught to use their eyes hygienically; above all we must forbid long continued reading or sewing.

Directly symptoms arise the eyes must be completely rested. Much can be done for these patients by prophylaxis. Prophylaxis is, however, useless for the more serious organic disorders, such as neuritis, haemorrhage into the retina and serous iritis.

Very careful prophylactic treatment for the eyes is required in anaemic and chlorotic patients if at the same time they suffer from myopia, because experience shows that myopia sometimes increases rapidly under these conditions.

Recurrent haemorrhages into the vitreous are relatively frequent in anaemic badly nourished young people. In pernicious anaemia and leucaemia and in melanaemia prophylaxis can do nothing for the eye affections which develop, namely haemorrhages into the retina and choroid, and, in the case of leucaemia, also lymphoma of the conjunctiva and orbit.

Gout and chronic rheumatism lead to conjunctivitis, iritis and choroiditis; there is no local prophylaxis. The same is true of cataract and choroiditis in obesity. Malnutrition and scurvy cause different diseases: the former causes xerosis of the conjunctiva and night blindness, the latter gives rise to haemorrhage into the conjunctiva, corneal ulcers and retinal haemorrhage. The prophylaxis is obviously that of the general disease.

Skin diseases on the face and near the eyes require, without exception, very careful watching and thorough treatment to prevent extension to the eyes. Especially in boils and carbuncles we must remember that extension of the morbid process to the orbital fatty tissues may produce the most serious results for the eye. The prophylaxis is not special, but is that comprised in general prophylaxis for the particular skin disease.

The same is true about parasites. There is no prophylaxis for eye disease caused by trichinosis, cysticerci, ecchinococci and filaria. Pediculi require energetic measures, because they may make their way to the eyebrows and eyelashes,

and cause tedious eczematous diseases and chronic hyperaemic conditions of the edge of the eyelids.

The general diseases which are the most frequently associated with eye disease and functional disturbances are diseases of the brain and nervous system. There is obviously no prophylactic treatment in these organic diseases which is capable of preventing the eyes from becoming implicated in the morbid process. The main point again here is the fact that a correct interpretation of the eye disease frequently leads to the diagnosis of the threatening or commencing general disease at a time when there are as yet no general symptoms. It happens not seldom that one who is suffering from commencing tabes dorsalis, paralysis, or disseminated sclerosis, or one who is suffering from cerebral syphilis comes to the ophthalmic surgeon for some paralysis of accommodation or paralysis of an extrinsic muscle or visual disturbance of some form, long before he himself or his friends notice any other sign of the general disease. In any case of disturbed accommodation which cannot be explained by the age of the patient, or any change in the reaction of the pupils, or paralysis of an ocular muscle, or disturbance of central or peripheral visual capacity, where the ophthalmoscopic examination is negative or shows optic neuritis or atrophy, the surgeon should most carefully examine the entire nervous system or see that it is examined.

The only diseases of the central nervous system which admit of any direct prophylaxis for the eyes are the so-called functional neuroses, neurasthenia and hysteria. Prophylaxis must here above all be educational or suggestive. If such a patient comes for treatment and it is absolutely certain that there is no organic disease to cause the eye trouble, it is best to listen as little as possible to the complaints of the patient and to assure him from the very first that the trouble is not very serious and can be cured. In this way we can prevent the patient from harping too much upon his condition and getting more severe eye symptoms. How careful we must be in this respect is shown by the following example. Some time ago I pointed out to my assistant physician a slight twitching of the orbicularis in an

hysterical patient suffering from a slight conjunctival catarrh. Next day the patient came with a well marked spasmodic ptosis of the eye on which I had demonstrated the twitchings, but the other eye remained free, although here too slight twitching had been present several days. Massage of the eyelids and parts around the eye quickly removed the ptosis, because the suggestion was associated with it that the spasm would at once be removed thereby. In other respects the prophylaxis is in general that of hysteria and neurasthenia, and the reader is referred to the section on diseases of nerves.

What has been said about the prophylaxis of neuroses applies also to the prophylaxis of those disturbances in the genital organs which appear generally in the form of eye strain. Here eye disturbances do not, as a rule, appear until other nervous disturbances have manifested themselves as the result of the disease.

Special prophylaxis is needed for the eyes during menstruation and pregnancy, as was pointed out under general prophylaxis.

If menstruation is normal and there are no disturbances in the region of the genital organs, prophylaxis is needed only for individuals who have a tendency to progressive myopia. Experience shows that amongst girls and also amongst boys, when there is a tendency to progressive myopia it advances rapidly during the period of development. The eyes of these individuals should therefore receive very careful attention, and the precautions already given on page 685 should be strictly carried out. During the menstrual period these girls should give up all near work. When this period of development has been passed these very strict prophylactic precautions may be relaxed, but absolute rest during the few days of the menstrual period should if possible be the rule for the rest of the life of these individuals.

If disturbances are present at the menstrual period, and menstruation is irregular, or there is some general trouble, such as chlorosis, which has an unfavourable influence on these functions, then all over exertion of the eyes which are otherwise healthy should be avoided by such individuals

during the menstrual period; because even if there is no fear of short sight, yet overstrain of the eyes during the menstrual period may cause those symptoms more or less, which are sometimes comprised under the term copiopia symptomatica.

The same remarks apply also to pregnancy. That which holds good for the menstrual period holds good also for the whole period of pregnancy, particularly for the early months. If during pregnancy a nephritis develops, with retinal disease, the artificial induction of abortion is indicated. But this is the only indication where an eye affection requires the induction of labour. Above all we must take care not to sanction the induction of labour because the patient complains of increase of purely functional disturbances, or of some other disease of the retina or uvea. Very frequently the desire to avoid an inconvenient increase in the number of children or the unpleasantness of pregnancy is the cause which suggests the increase of eye symptoms.

Symptoms of eye strain are common in endometritis, parametritis and perimetritis. There is no prophylaxis except treatment of the primary trouble.

Onanism and sexual excesses may also cause eye affections. The symptoms caused by the former are slight conjunctivitis, slight insufficiency of the internal recti, slight weakness of accommodation, flickering and slight photophobia, and it is characteristic that the troubles are out of proportion to the objective condition. In sexual excesses the same symptoms appear, but there is also ciliary pain and a tendency to scotoma. The only prophylaxis possible is to put an end to the vicious habits. But in order that this may be done a knowledge of the symptoms is essential and they have therefore been given here.

2. *The Prophylaxis of Eye Affections due to Occupation, to Accidents and to Poisons*

We bring together under one chapter these diseases due to occupations, accidents and poisons, but this is not because these injurious effects occur only during work. The reason we put them together is, that though apparently

of different nature yet they stand in intimate relation to one another. On the one hand a number of cases of poisoning occur only to those who work at certain trades; on the other hand working at a certain trade so often causes eye injuries that we might almost look upon these particular eye injuries as characteristic of that trade.

If we were to separate these instead of dealing with them as a whole in one chapter, a large number of cross references would be required which can thus be avoided. Upon the whole moreover only those injuries can be certainly prevented which are caused by following the trade itself, because they alone can be foreseen. All such injuries which occur apart from trade are, with the exception of poisoning by alcohol or by tobacco, more or less accidental conditions which cannot be foreseen and cannot therefore be avoided. In the following pages we shall therefore first mention trade diseases and poisoning caused by the work, as well as wounds thus produced. Then we shall consider the prophylaxis of injuries and poisons due to causes not connected with occupations, so far as prophylaxis is possible in these.

First the question to be answered is: wherein lies the difference between trade diseases and trade accidents? Trade disease is an injurious condition which is so closely related to the work that it invariably appears after one has worked for a longer or shorter time at the trade, and cannot be prevented by precautions, or if it is accessible to prophylaxis will appear under all circumstances if such precautions are neglected. That individual predisposition plays a large part in this is obvious. One individual soon gets ill, another only after a long time, though the conditions have been the same. In some diseases the nature of the disease depends mostly upon individual predisposition: the same injurious conditions may produce spasm of accommodation in one individual while in another it produces myopia.

Further a distinction must be made between *direct* injury to the eye, in which the work has caused disease of the eyes only not accompanied by any injury to the general health, or at least not necessarily so accompanied; and

indirect injury, in which disease of some other part of the body or a general disease always precedes the eye trouble, although it may be the eye trouble which first brings the patient to the physician. Trade accidents on the other hand are those injuries which do not necessarily follow the occupation, even though all precautions be omitted. Predisposition is not here concerned. It is essentially an accidental occurrence that is the cause.

Trade diseases of the eye may be external organic diseases or functional disorders, or may be secondary organic and functional disturbances mostly the consequence of infection.

Among external organic diseases we have chiefly to consider conjunctivitis, and in association with this disease of the cornea with its secondary phenomena. These may arise in any trade in which the air of the workroom or the air near the workman is rendered impure by smoke, dust, soot, or other small particles. The general precautionary measures required are the same as those for similar conditions which appear apart from trade, and the special precautions to be demanded for those who are engaged at such trades are that the rooms should be thoroughly ventilated by the introduction of fresh air and the removal of the impure air, and that accommodation should be provided for the workpeople where they can change their clothes, wash and bathe, and thus cleanse themselves several times during the course of the day, or at least on leaving off work. In occupations where the dust produced by the work is of a very irritating nature, as in the manufacture of chemical products (for example cantharides), there should be suitable contrivances to catch the dust so that as little of it as possible may get into the air of the workroom. Sometimes it may even be necessary to adopt the use of special protective glasses or protective hoods as a direct protection of the eyes and respiratory organs. Details about the forms of protective hoods and glasses will be found at the end of the section on the prophylaxis against accidents (p. 720).

Functional disorders occur from overstrain of accommodation or sight, and as the result of insufficient light or enforced abnormal position of the eyes; also as the result of

dazzling which may in some cases be combined with organic injury through radiant heat.

The first kind of functional disturbances caused by over-use of accommodation and of sight may occur at any trade where long continued near work at small objects is required. It affects more especially compositors (who in addition often suffer from lead poisoning), lithographers, wood-engravers, copper-plate engravers, designers, photographic retouchers, goldsmiths and jewellers, and needlewomen and those who work at embroidery. The injurious conditions met with in these trades are the same as those mentioned as functional disturbances under general prophylaxis, and under the special prophylaxis of functional disorders.

One only of the essential conditions enumerated under general prophylaxis will be found impossible to secure at some trades, namely the condition that light should enter from the left. In a number of occupations it seems necessary that the light should enter from the front; this is especially the case when both hands are used equally, as with goldsmiths and jewellers and diamond cutters. In these cases the light should be prevented from entering directly into the eye by wearing a shade to protect the eye, or by arranging a shade over the work table. These injurious conditions of near work are increased, especially in women, by other indirect injuries which result from the sedentary nature of the work and the constant bending forwards. These are chiefly anaemia and chlorosis, and in women disorders of the pelvic organs. Details will be found under eye diseases which are produced by general disturbances. A special form of injury arises from threading the needles in embroidering by machinery. School children are often employed for this. The needles are as thick as an ordinary embroidery needle, three-quarters of an inch long, pointed at both ends and with the needle eye in the centre. The work is very trying to beginners and the eyes soon get tired. These children all complain that their eyes soon tire when they are learning this threading; they get red and the tears overflow; and sometimes the children complain of headache. When practised at the work they rely more

upon the sensibility of their finger tips and these symptoms disappear. If there is predisposition to short sight myopia soon develops or gets worse. As a prophylactic, we should demand that inexperienced workers be allowed to rest often during the work; and children who have a tendency to short sight should not be allowed to do this work.

Watchmakers and workmen who do very fine and exact mechanical work are compelled to work in a special way. They work for the most part with magnifiers and thus use one eye only; the result is they soon learn not to use the other eye, and relax its accommodation. In the course of time the working eye develops a certain weakness of accommodation, the internal recti become insufficient and there is a weakness of convergence. The same result occurs among goldsmiths and jewellers who work with magnifiers, and also among wood engravers. No special prophylaxis is possible, neither is it very necessary because the injury is a comparatively trivial one and may easily be undone by proper spectacles.

The constant strain of looking upwards while working causes nystagmus in miners, who are often obliged to work lying on their backs. The development of the disease is still further helped by the bad light and food. Among workers in foundries night blindness is not rare. Prophylaxis requires that the periods of work should be short and the food good.

Disease caused by dazzling occurs among those engaged in electric work, and in places where iron is welded by electricity. The disease thus caused corresponds exactly with that spoken of already as caused by invisible rays.

Among those who work close to fires, especially glass-blowers, cataract is frequently found to develop through the constant action of the radiant heat; as a prophylaxis protective spectacles should be worn as described below in the section on protective spectacles.

The secondary injuries to the eyes caused by work are without exception injuries produced by poisons. Lead and

arsenic poisoning are met with in painters, whitewashers, typefounders, plumbers, and among workers in lead and arsenic works, and among workmen in factories where lead and arsenic are used (especially in the manufacture of colours and in the weaving of silk goods). In addition to the wellknown general signs of poisoning these workmen develop typical neuritis, paralysis of muscles, accommodative and muscular asthenopia and disturbance in the reaction of the pupils. When complicated with albuminuria albuminuric retinitis has also been observed. In very rare cases hemianopia has been seen, and among workers with arsenic conjunctivitis also and its results.

The disease is so common that almost all countries have laws to prevent lead poisoning. They are all aimed at preventing the inhalation of lead particles or vapour, and try to prevent the skin from being soiled by materials containing lead, or at any rate to render them innocuous as soon as possible. A special dress, plenty of accommodation for washing and bathing, and rules forbidding eating and drinking in the workrooms are of the greatest importance.

In gutta-percha factories poisoning by carbon disulphide occurs and manifests itself as a neuritis; but the disease is not very common. The abuse of tobacco and alcohol predisposes to it. Poisoning may be prevented by adequate ventilation; if the disease occurs the occupation must be changed.

In the manufacture of aniline colours and of blasting materials, for example roburite, nitro-benzol is extensively used. Poisoning with this gives rise to neuritis in addition to general symptoms. The precautions required are similar to those for lead and arsenic poisoning. Aniline works produce disease similar to that caused by poisoning with nitro-benzol; symptoms of poisoning are especially apt to appear from dealing with aniline oil. In addition we find greyish yellow discolouration of the conjunctiva and cornea, and inflammation of these. Prophylaxis consists in adequate ventilation.

Workers with phosphorus who suffer from phosphorus necrosis may also have necrosis of the bones of the orbit,

retinal haemorrhages, and fatty degeneration of the retina. The prophylaxis is similar to that for lead poisoning.

Workers in tobacco factories get a neuritis as the result of nicotine poisoning. Workers employed in the manufacture of liqueurs in rare cases get disease of the optic nerve as the result of alcohol poisoning. Prophylaxis consists in adequate ventilation.

Accidents to the eye are naturally very frequent in trades, but differ very much according to the nature of the occupation. In some trades accidents to the eye are so rare that one can scarcely speak of the necessity of any protective measures; in others they are of almost daily occurrence, so that, as previously stated, we may almost regard such accidents as injuries peculiar to that trade.

The injuries through accidents which we have here to consider may be arranged in three groups: mechanical injuries, burns and injuries by caustics.

Mechanical injuries occur most frequently in the iron and steel industries. And next we find them in the metal, wood and stone industries, and in mining. Mechanical injuries are also fairly frequent in the building trade, though corrosion by lime is relatively more frequent as will be explained below. In the manufacture of mineral waters injuries are produced by the bursting of bottles and flying out of corks. In the metal, wood and stone industries the injury is in a very large majority of cases caused by foreign bodies, such as pieces of iron, steel sparks and splinters, splinters of other metal and of wood, and particles of stone. In quarry work and mining injuries are caused by blasting. The injuries are very different and vary from the simple penetration of a foreign body into the superficial layers of the conjunctiva and cornea, which heals and leaves no ill effects, to the total loss of the eye through penetration of large foreign bodies into the interior of the eye or the total disorganization of the eye by rupture caused by great force.

In weaving eye accidents are peculiarly common, because the shuttles are very apt to fly out of the shuttle box whenever they make more than fifty journeys a minute.

The danger of these wounds is not only that of the consequences of the wound itself, but there is also the danger that it may have been infected by the object which produced the injury, or that it may become infected afterwards by want of care, and thus lead to purulent infiltration serpiginous corneal ulcers, cyclitis and panophthalmitis.

This danger of infection, even of quite trivial wounds of the cornea, is very common in agricultural pursuits. In harvest work, binding and stacking hay and straw, and pruning hedges and trees, it is not rare to meet with small superficial abrasions of the corneal epithelium caused by dust or grain or husks which get into the eye, or by the direct contact of the eye with the straw or hay. These superficial wounds of the cornea may then become infected if the conjunctiva or lachrymal sac is in an unhealthy condition, or the objects which inflicted the wounds may themselves be the carriers of the infection, or the infection may be conveyed by wiping the eyes with the fingers which are soiled. The result is generally a serpiginous corneal ulcer, and it is so common among farm workers that the French call the disease harvesters' keratitis.

Moreover in gardening and forestry small corneal erosions are produced when branches or pointed leaves come into contact with the eye. It is characteristic of these that they heal quickly without leading to any infiltration, but later give rise to "recurrent corneal erosions."

Injuries by blunt instruments, especially by the horns of cattle, are also characteristic injuries in agricultural pursuits. Prophylaxis in all such injuries consists partly in the endeavour to prevent the injury altogether, and partly in the prevention of the consequences of the injury.

The injuries may be prevented by mechanical contrivances, applied either to the work place or to the eyes of the workman: protective shields or spectacles. Further details will be found at the end of this section. As a special contrivance we will instance the shuttle catcher of weaving looms. There are many such contrivances; Albrecht's is probably the best.

When in spite of all precautions an injury has been

sustained, the possibility of infection must be prevented. Wiping the eyes with the fingers or with handkerchiefs or aprons, which are mostly not clean, must be strictly forbidden; clean water or, better still, some disinfectant should be used to wash out the eye and the injured man should be quickly taken to the doctor. All this can only be attained by constant instruction, and very much good would be done by having rational hygiene a subject in the curriculum of elementary schools. The prophylactic measures to be adopted to prevent the secondary results of such injuries have already been given.

Injuries through burning are met with chiefly in the metal industries, and are caused by hot pieces of metal flying into the eyes; they may be caused also by blasting in quarries and in mining. Prophylaxis for the former will be described below, under protective contrivances; that for the latter is adequate care.

Corrosions are most frequently caused by lime or cement in the building trade, and in the chemical industries and in the manufacture of drugs they are caused by the spirting into the eye of corrosive or irritating substances and gases.

The prevention of these injuries will be described at the end of the section, among protective contrivances. In regard to the prevention of the results of any such injury prophylactic treatment is particularly important in the case of injury by lime.

Two methods of prophylactic treatment must be considered: washing out with oil and washing out with large quantities of clean water.

In using oil it is very important not merely to drop the oil into the eye, but by means of a syringe holding about 3 ounces to syringe out the eye fairly forcibly, while it is held open, and to remove as quickly as possible all particles of lime by means of a piece of wool dipped in oil. The oil is injected so that it will envelope the lime particles and prevent their further corrosive action, and at the same time the tissues are covered by a layer of oil and thus protected against being corroded. If there is no oil at hand the eye may be washed out with water. But it is of the utmost

importance that a large quantity of water should be poured in a constant stream over and into the eye, so that the lime or cement may be removed at once. If but little water is used the contrary effect will be produced; the corrosive material will dissolve and spread over the whole eye.

In injuries by caustic alkalies it is equally necessary to remove the substance as quickly as possible from the eye and to neutralize it. For this purpose a solution of acetate of lead is best, because it is a weak acid and will neutralize the alkali.

We have seen that injuries to the eye may be caused by splinters of all sorts which fly into the eye, by chips or sparks, cold, hot or glowing pieces of metal, drops of molten metal, hot slag, and spirting or corrosive fluids; also dust, smoke, certain vapours, fumes, gases and glaring light. There are two ways in which these injuries may be prevented: protective screens fixed to the machine itself and protective spectacles. The protective screens made of wire grating or glass, are so fixed that they catch the splinters or sparks or other substances which fly out. They are therefore useful only for occupations where the direction which will be taken by these flying pieces is known, as in grinding or weaving. In some cases the machine and work can be covered in with a glass case, so that the working can be seen and the splinters caught. If other workmen near are also endangered by pieces that fly off, it seems best to separate the workmen's benches one from another by protective partitions; such partitions, generally of wirework, are also required to protect passers-by; for example, in breaking stones in the road to protect passers-by from pieces which fly off. When these protective measures cannot be adopted the workmen should wear protective spectacles.

When we remember the serious injuries to the eye to which a workman may be exposed and which often cannot be remedied, one would think the workmen would gladly and gratefully avail themselves of such protection. But it must be acknowledged that a large number of workmen have a decided objection to wearing anything to protect the

eyes, and the endeavour to enforce the use of these spectacles may lead to open resistance and to strikes; and this happens notwithstanding the Prussian accident law of 1884, by which those who fail to carry out the precautions prescribed are punishable with fines up to six marks.

It must be confessed that this reluctance is not altogether unjustifiable, because masters, just to conform to the legal regulations, often supply spectacles which are cheap, but more or less useless for the work to be done.

The complaints of workmen are chiefly the following—

(1) That these compulsory spectacles, especially when provided with side pieces, limit the field of vision and make the wearer uncertain in his work; (2) they diminish the acuteness of vision; (3) that they often soon cause pain in the eyes, headache and giddiness; (4) that the glasses often get covered with steam and become misty; (5) that they produce a sensation of heat in the face and that perspiration readily accumulates behind them; (6) that the metal spectacle frames become so hot as to be uncomfortable; (7) that many spectacles are too heavy; and lastly (8) that even when one puts up with all this, the spectacles do not give the protection which was expected from them, and that the workman has all these discomforts very often without any good result.

These complaints show that many of the protective spectacles in use by workmen are not suitable.

In general we may say that the workman's spectacles should be as light as possible, the frame strong, and easy to fasten to the head; they should fit comfortably, give as large a field of vision as is possible, and in order that the eye may not become heated they should admit of free ventilation. If glasses are worn in the spectacles, they should be easy to clean and to change. If the work requires acute vision the spectacles must not restrict acuteness of vision; when glowing, hot or corrosive material has to be handled which might spirt out, that part of the spectacles which is in contact with the face must be

made of some bad conductor of heat, and sometimes the whole face and head will need to be protected.

Protective spectacles for use when working with hard materials demanding good vision must be made of glass. For work where pieces do not fly into the eye from the side, the ordinary shell shaped white glass is enough; but the glasses must be as large as possible, and sometimes two or three times as thick as the ordinary spectacle glass. A diameter of an inch and three quarters and a thickness of a sixth of an inch generally suffice.

When protection is required against particles which enter the eye from the sides as well as from the front, the frame must fit round the rim of the orbit. Most protective spectacles for this purpose are modifications of the drum shaped spectacle. Spectacles with pieces of mica and more recently spectacles made entirely of celluloid may be recommended. The frames of the spectacles are made of metal and are generally mounted upon leather or a soft material so that they may be more firmly fastened to the head and may exercise as little pressure as possible upon the face. The frame itself is perforated or made of wirework to allow of circulation of air.

For working at and for breaking up hard materials, when acute vision is not required, protective spectacles of wirework are used, hollowed out in front of the eyes and covered with leather or some soft material where they rest against the face.

When working with glowing, hot, or corrosive materials which may spirt out, and when working in rooms filled with dust or smoke, protective masks or hoods are best, by which the face and head are protected by wirework, or by pieces of glass or mica let into a hood made of suitable material; this should be made of asbestos when there is danger of fire. For work which does not require acute vision and in which the whole face and head have to be protected, as in the manufacture of mineral waters or other effervescing liquids, it is best to use a contrivance like a fencing mask.

It would take us too far to enter into the various forms

of the different protective screens and spectacles; their number is so great that Hartmann and Villaret's book on workmen's protective spectacles alone gives illustrations of seventy-one different kinds. It ought moreover not to be difficult to select according to the principles given above that form which is best adapted for the work.

For injuries of the eye which are not caused during work, but either from the thoughtless handling of dangerous instruments or as the result of criminal attacks, there is obviously no prophylaxis. Severe punishment for thoughtlessness and for criminal acts, and careful teaching and supervision of children are the only possible protective measures. We cannot emphasize too strongly the very great danger of playing wtth percussion caps, powder and fireworks, and the shooting of arrows and the throwing of stones. In regard to little children, the old proverb is true: "Messer, Gabel, Scher und Licht, taugen für kleine Kinder nicht." (Knives, forks, scissors and lights are not good for little children.)

Similarly there is no prophylaxis against poisons apart from occupation, except in the case of alcohol and tobacco, of botulism and fungus poisoning. Prophylaxis for alcohol and tobacco may be summed up in the word—moderation. Prophylaxis against botulism and moril poisoning is restricted to the caution not to eat food except it be free from suspicion. We must here confine ourselves to mentioning the eye symptoms of various poisons: exact knowledge of these symptoms may sometimes lead to a quicker recognition of the cause of the illness and be of prophylactic value in the wider sense, because it gives the physician an opportunity of eliminating the cause of the poisoning in case it is still at work.

All the poisons which are met with in trades may also occasionally be the cause of poisoning apart from trade. These have already been mentioned, and we shall therefore here merely speak of possibilities of poisoning which are not met with in trade.

If we find mydriasis with paralysis of accommodation we should think first of poisoning by a mydriatic or by

deadly nightshade. But these symptoms are also characteristic of snake bite, moril poisoning and above all of poisoning by decomposed meat. In meat poisoning this is accompanied by ptosis, muscular palsy and severe general symptoms with corneal affections similar to those described as the result of the typhoid state.

If we find small pupils with spasm of accommodation which can only be determined when the general condition of the patient admits of the reading test, we should think of poisoning by eserine or pilocarpine, or by a narcotic, especially morphine, opium or chloral.

Severe optic neuritis is characteristic of poisoning by alcohol and nicotine, but it may also be the result of a longer or shorter constant use of large quantities of quinine, and may appear in an acute form in poisoning by salicine, carbolic acid, iodoform, pomegranate root bark and filix mas. Poisoning with coal gas or carbonic oxide may also cause serious disease of the optic nerve, either alone or accompanied by paralysis of ocular muscles, disturbances in accommodation, disturbances in the reaction of the pupil and exophthalmos.

Chronic ergotism, pellagra and naphthalin poisoning lead to cataract. Coloured vision has been observed with various poisons, and may sometimes point to the cause of the poisoning and suggest the appropriate prophylaxis. Yellow vision is observed in poisoning by picric acid and chromic acid, and regularly in poisoning by santonine; it has also been observed in carbonic oxide poisoning. Red vision points to poisoning by mydriatics; violet vision to poisoning by fungi or Indian hemp.

3. Prophylaxis in Heredity

Prophylaxis in heredity for the prevention of eye diseases has not yet received the attention it deserves. Apart from certain diseases and functional disturbances, such as Leber's optic atrophy, colour blindness and predisposition to cataract which tend to be hereditary, the predisposition to myopia, high degrees of hypermetropia and astigmatism are decidedly hereditary; and that retinitis pigmentosa is frequently

(if not always, as was once thought) a consequence of marriage between relatives, is a fact known to all physicians.

The inheritance of eye disease may be divided into three groups—

1. Development of eye disease through heredity from parents whose eyes are healthy.
2. Inheritance of eye diseases from parents.
3. Inheritance of diseases which may lead to secondary eye disease.

To the first class belong those eye diseases, especially retinitis pigmentosa, which are caused by consanguinity in the parents; and also those eye diseases which arise through atavism, that is in which the tendency to the disease is present in the ancestor. A typical example of this kind of inheritance is when a grandfather is colour blind and his grandson inherits the colour blindness through a daughter who had normal colour vision. We have here to consider also different abnormalities in refraction and muscular abnormalities connected with them.

To the second class belong Leber's hereditary optic atrophy, the tendency to cataract, and directly inherited errors of refraction and muscular disorders with their consequences. To this class also belong anomalies of development, such as coloboma of the iris and choroid.

To the third group belong tuberculosis and syphilis specially.

Prophylaxis is almost an impossibility, because when at the present time among civilized races the question of marriage is considered, the state of the physical conformation of those who wish to marry is the last thing which is had regard to, save in so far as beauty of face and of bodily form are concerned. From the oculist's point of view marriage between blood relations should not be permitted, and very shortsighted people should marry those only who have normal sight or are hypermetropic; in short two persons who have each the same kind of refractive error should not marry one another. Individuals among whose ascendants there have been diseases such as Leber's hereditary optic

atrophy, very early cataract, or coloboma, should not marry. The same is true of consumptives and of those who have syphilis which has not been completely cured.

It is obvious that these are merely counsels of perfection which will probably never be carried out. But the physician should always, when opportunity arises, at least endeavour by teaching to make these conditions more familiar to the public than is at present the case.

4. Prophylaxis in Operations

The prophylaxis in operations on the eyelids, conjunctiva, ocular muscles, orbit and lachrymal sac, is that of a general surgical nature. Reference for this should therefore be made to the chapter on surgery.

It is otherwise with operations in which the eyeball is opened, because the very least infection will then in most cases not only render the result of the operation doubtful, but even endanger the whole eye. In these operations the utmost care must be taken that all possibility of infection is excluded with the same scrupulousness as is required in general surgery for laparotomies and intra-cranial operations.

It is extremely difficult to produce and maintain an aseptic operation field for these intra-ocular operations. On the one hand the delicate structure of the organ makes it impossible to treat it, as we should the skin, with strong antiseptics, soap, brush and alcohol. On the other hand its position exposed to the outer air, with a mucous membrane suitable for the deposit of germs and its communication with the nasal cavity, offer opportunities for infection.

The bactericidal properties of the lachrymal secretion give a certain amount of protection, but must not be overvalued, as has recently been the tendency among adherents to the open wound treatment. In ophthalmic surgery asepsis alone is insufficient and we need to avail ourselves of antisepsis, especially as a prophylactic. The first and most important prophylactic measure for intra-ocular operations is to cure carefully all disease, inflammatory or otherwise,

of the eyelids, conjunctiva and lachrymal organs, and all inflammatory disease of the skin of the face.

The mucous membrane of the nose and pharynx should also be considered.

If there is inflammation of the lachrymal sac the most rational proceeding is to extirpate the sac. The simple occlusion of the puncta lachrymalia, by ligature or cauterization, does not suffice, because these procedures cause wound surfaces which themselves afford another opportunity for the settlement of infective germs.

When all existing disease has been thoroughly cured, or if there was from the first no deviation from the normal, preparations may then be made for the operation.

Twenty-four hours before the time fixed for the operation the face should be washed with a solution of corrosive sublimate (1 in 5,000), or if there is an idiosyncrasy against corrosive sublimate, with a three per cent. boric acid solution. The eye should then be washed out with a similar solution and compresses of it applied to the eyes for several hours. The evening before the operation day a so-called "trial dressing" is put on. This consists of a piece of sterilized lint dipped into an antiseptic solution; a piece of sterilized wool is placed over this and the whole is secured by a sterilized bandage.

Next morning, if there is no trace of secretion on the lint or on the edges of the eyelids or inner angle of the eye, we may safely proceed with the operation; otherwise the operation must be delayed and the conjunctiva or eyelids be treated until the trial bandage shows that there is no longer any secretion. There is a further great advantage in this preparatory treatment, because we learn whether there is any intolerance of the skin towards a particular antiseptic or dressing; for instance any tendency to "bandage eczema."

Some physicians have expressed a fear lest such a prolonged period of preparation should act unfavourably upon the patient, because he is excited and made anxious by waiting for the operation; but my experience of many years has not shown this to be the case. On the contrary when

the patient sees that everything is being done to make the subsequent operation successful and to prevent any ill effects, he loses any over anxiety he may have felt as to the result and approaches the operation with greater confidence.

The slightly longer time taken up by the treatment need scarcely be considered compared with the importance of obtaining a successful result in every operation. Although a loss of two or three per cent. may not seem great in medical statistics, yet the loss falls very heavily upon the individuals in the case of eye diseases, and to reduce the losses by even one per cent. is a great gain.

I am well aware that this method of treatment is contrary to that adopted by most ophthalmic surgeons, especially by the believers in the open wound treatment. This is not the place for long theoretical explanations. I will merely remark that my clinical experience has fully confirmed the practicability of the method recommended; and clinical experience, not theoretical hypotheses, must decide in such cases. Since the year 1888, when I introduced the method just described because I had had the unfortunate experience to lose an eye after an operation for cataract, in which a slight chronic dacryocystitis had not been discovered—in spite of a careful examination—I have had among about 1,000 cases of extraction of the lens to lament only one primary loss of an eye, and that occurred in a man sixty-eight years of age, who in the night after the operation had an apoplectic fit with facial paralysis upon the side operated on and paralysis of the opposite half of the body; a case which I am therefore justified in excluding altogether from the statistics. The same is true about the second case of wound suppuration with which I have met during the last twelve years: here it was not a case of primary infection but of suppuration which appeared after three days of perfectly normal healing in extraction of a senile cataract without iridectomy, for during the night between the third and fourth days the wound opened and great prolapse of the iris occurred.

As I do not imagine that I operate better than the

majority of my colleagues, and as my after treatment does not differ from that of others who use the occlusive bandage, I think I am justified in attributing my better general results to the departure from the ordinary method which I made, and which has recently been proposed also by others—that is the preparatory prophylactic treatment above described.

It remains only to mention now the prophylaxis of the operation itself. Above all we must avoid operating in a bedroom or living room; the operation should be done in a room arranged in accordance with ordinary surgical principles. As an example I will describe the method of operation as carried out in the institution conducted by me. The patient having had a bath and put on clean linen is first put into a room next to the operation room, and called the preparation room, in which are also the sterilizers for the linen, bandages and instruments to be used for the operation. In this room the patient's face is again washed with corrosive sublimate soap, and sterilized gauze dipped in corrosive sublimate solution is fastened over the eye by a sterilized bandage. Before the sister in the operating room receives the patient she disinfects her hands thoroughly and puts on a sterilized overall which completely covers her dress.

The eye is then anaesthetized, still in the preparation room, by means of some sterile solution. I use cocaine or holocaine. The patient is then laid upon an operating table, and the upper part of the body and the head are placed on a sterilized linen sheet. The upper part of the body is then covered with a large sterilized cloth reaching up to the chin, and a gauze mask is placed over the face with two slits in it for the eyes. These gauze masks have previously been for some days in a corrosive sublimate solution of 1 in 1,000.

The operator and assistants are dressed in sterilized overalls.

Instruments, even cutting instruments, are placed in wire baskets and boiled in soda solution. I have never found that they are wanting in sharpness if the same instrument is not used too often. They are then placed

in these wire baskets on a table covered with a glass top which has previously been washed with a strong corrosive sublimate solution. The table is placed beside the operator, and the instruments are covered over till the moment of the operation with a sterilized cloth.

When the patient is in position, that part around the eye which is not covered by the gauze mask is again washed with a solution of corrosive sublimate (1 in 5,000), the eye is washed out with sterilized normal saline solution and the operation is commenced.

At the operation we must see that the instruments do not pass through two hands except when rapidity of operating makes it absolutely necessary. Otherwise the operator should himself take every instrument out of the wire basket.

It is hardly necessary to mention that in changing the bandages asepsis must be strictly carried out and that the patient must not be put into a room in which there is anyone with an infective disease.

(c) *Prophylaxis at Different Periods of Life*

After what has been said in the previous chapters about general prophylaxis and the prophylaxis of the different diseases, it would appear at first sight superfluous to consider now the prophylaxis for the various periods of life. It is obvious also that in this chapter nothing will be said that has not already been said in the previous chapters. But, proceeding from the same point of view as in the last chapter, that this present work is intended for quick reference for the practising physician, it does not seem undesirable to make it possible for the reader to get a rapid idea of the prophylactic measures upon which the greatest stress is to be laid at the different periods of life. For although all that has been said applies upon the whole to every period of life, yet every part has not the same degree of importance for each period of life.

Efforts to prevent disease should, as appears from the prophylaxis of heredity, begin even before the individual is conceived or born. But as this period is not included in the scope of this present chapter it may be passed over.

But from the moment of birth prophylaxis for the different periods of life begins. As we saw in the chapter on conjunctivitis neonatorum, the first danger threatens the young child when it is passing through the genital passages, because the first danger which threatens the eyes of the newborn child is infection with pathological vaginal secretions while the head passes through the vagina. The necessary prophylactic measures will be found on page 666.

When the child has been protected from the conjunctivitis the second question that arises is its relation to light. Shall the eyes of the young child be protected from the light or shall they be exposed to the light regardless of precautions?

The one method would be as wrong as the other. The eyes of the newborn child seek the light of day to teach them to work, and we should therefore avoid surrounding the cradle with thick curtains or covering the windows as over anxious people are apt to do. Daylight is as great a need for the young eyes as is pure air for the young lungs. But this does not mean that the eyes of the young child are to be directly exposed to artificial light or even to sunlight. That too would be wrong. For on the one hand the reflexes against light are extraordinarily defective during the first weeks of life, and on the other hand the protective organs are so thin that they do not fulfil their object effectually. Moreover the eyes of the newborn infant are very deficient in pigment, and one of the best protections against dazzling is therefore lacking in early life.

We should then protect the eyes against glaring light, but allow the eye full access to diffuse daylight in a mild form. This is a very important prophylactic measure. For while on the one hand an anxious exclusion of light tends to delay the quick development of the functional use of the eye, the direct effect of glaring light on the other hand, especially of sunlight, may cause permanent injury by reducing the sensitiveness of the retina. I am firmly convinced that many an apparently congenital nystagmus has been caused by dazzling effects in the young child.

The way in which children are taken out in the open air also needs consideration.

A perambulator with a movable cover which, according to the position of the sun, can cover the front or back of the perambulator, is to be recommended for this purpose.

Moreover the infant should not be protected from the dust by very thick veils.

The remaining prophylactic measures for the young child correspond exactly with general prophylactic measures, and will not here be further mentioned. We shall merely state that in bathing the child the same sponge should not be used for the eyes which was used for other parts of the body. This ought to be self evident, yet the general practitioner has even more opportunities than the ophthalmic surgeon for knowing that this is not self evident to many mothers.

While the young child's eyes have only to be protected against organic disease and dazzling, the dangers which threaten the eyes become more numerous in childhood. In addition to the dangers with which the eye is threatened by disease, other dangers arise in even greater number from the use of the eyes. The dangers which principally arise from disease are those caused by general diseases; prophylaxis must therefore be directed chiefly towards the prevention of general disease, and reference to this should be made under the various sections in the chapter of prophylaxis in disease and functional disturbances arising from general disease. Special attention should be given to the chapter on the prophylaxis of scrofulous disease.

As regards the use of the eyes the following prophylactic measures should be noted—

During the first years of life the eyes should be gradually more and more prepared for the great demand which will be made upon their endurance during school life. The child's chief exercise is play, and its future depends very much more upon this play than is generally imagined. The child's arms are short, and when it wants to look at anything it therefore involuntarily brings the object near its face. Moreover the child's eye is not accustomed to work at small retinal images; it seeks so far as possible to obtain large images and the tendency to bring the object close to the eyes is thereby increased. This approximation

of the object is injurious, for the reasons stated under functional prophylaxis (see page 649), particularly when the eye is markedly hypermetropic or has a tendency to progressive myopia. It is therefore better not to give small objects such as small pictures to such children. It is better to give them a box of bricks for building, a ball and such things which do not require to be very closely looked at and with which moreover they can play out of doors. The unavoidable picture books should contain only well defined objects and above all should be properly coloured. This is the right time for learning to distinguish by name colours and their various tints. It is well too not to give the child too many picture books at a time, but rather to give him one and not give him another until he knows the first one thoroughly. The child is apt very readily to acquire a habit of superficiality in seeing which is very difficult to overcome later. Observation should be learnt when the child learns to see. It is often useful too to let the child say how large this or that object is; in this way it learns to estimate by the eye. We must warn against too early learning to read and to write because this strains the eye unnecessarily before the fifth or six year.

Special caution is required against the growing evil custom in kindergartens of developing the child's sense of form at this early age by fine plaiting work or even by stitching perforated cards and trellis work. One must strongly caution against such work, especially for children whose parents have some refractive error or myopia.

When the child reaches school age the dangers which threaten its eyes are naturally increased.

There are two chief factors which are injurious, namely infection by aggregation with other children who have eye disease and near work. In regard to the first point refer to pages 663, 667 and 669.

As regards the second point prophylaxis against the ill effects of near work is essentially a struggle against one form of disease—the struggle against short sight. Although hypermetropic and astigmatic eyes may cause trouble and give rise to direct symptoms of disease, a systematic pro-

phylaxis is not so necessary for them. The trouble which such eyes cause the patient in doing near work will by itself quickly suggest the necessity for medical aid and the necessary prophylaxis—correct spectacles.

We should always bear in mind that a hypermetropic and an astigmatic eye are merely abnormal eyes, but that a myopic eye is a diseased eye.

Myopia however is generally only recognized when it is too late; and in a large majority of cases myopia is an acquired disease.

Although a few ophthalmic surgeons have recently expressed a contrary opinion, yet they cannot get rid of the fact established by the examination of the eyes of hundreds of thousands of school children, that the cause of myopia is near work and that schools make children myopic. Facts such as those for example given in Seggel's statistics cannot be got rid of by theoretical views. Seggel examined 1,600 soldiers in the Munich garrison, and found—

1. That among the peasants 2 per cent. were short-sighted.

2. That among day labourers and town dwellers 4 per cent.

3. Among artisans and those engaged in trades 9 per cent.

4. Among merchants, writers and compositors 44 per cent.

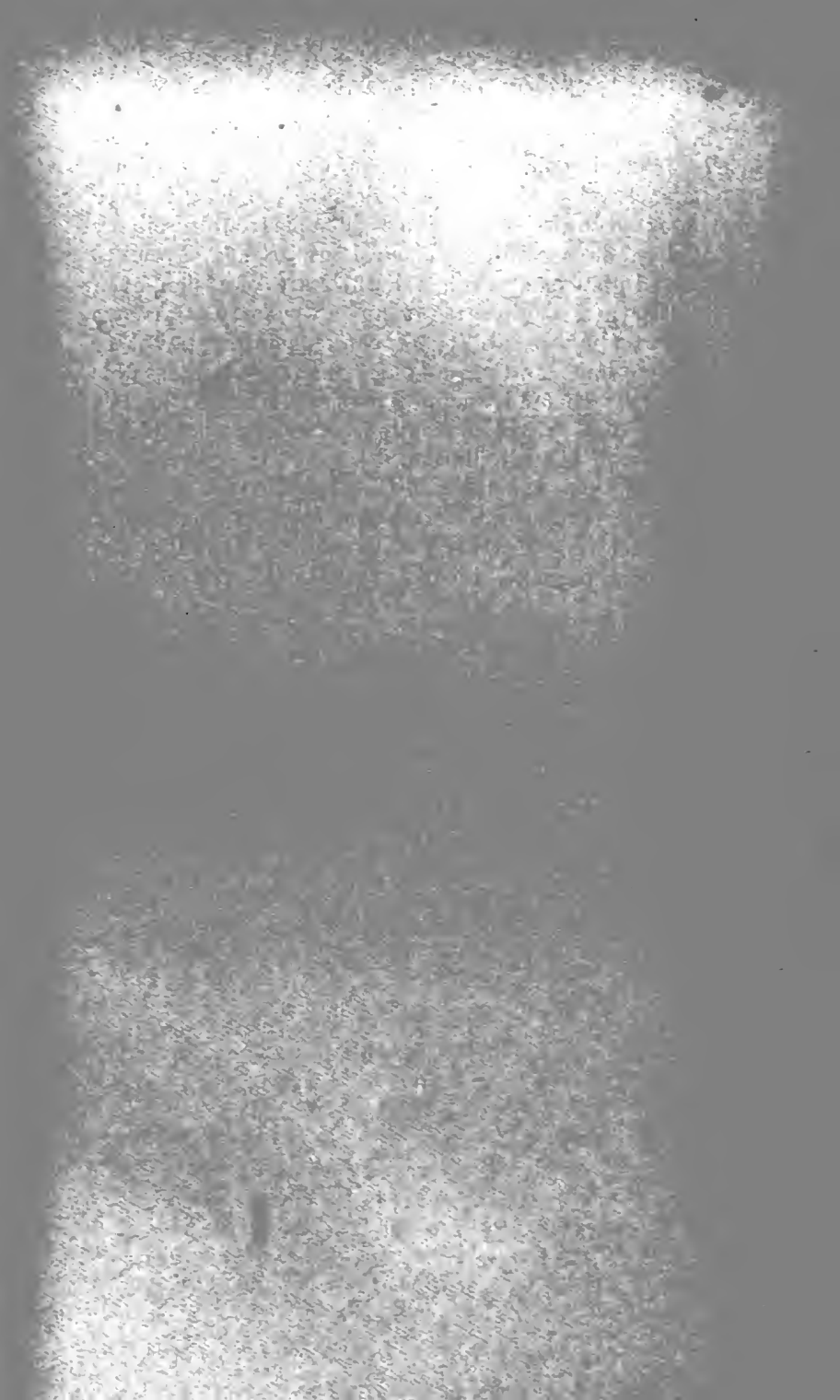
5. Among those who had completed their studies at public schools 65 per cent. had myopia.

In regard to prophylactic measures needed, reference should be made to the subject of myopia (page 685), to the question of illumination (page 652), and to the amount and kind of work (page 656).

When the age of twenty has been reached and manhood entered upon there is no longer danger in near work, except for a comparatively small number of people whose myopia tends to progress even after that age is attained. Such people must all their life be very careful about near work, but others may work with greater safety. Nothing more is then required beyond the correction of any error of refraction and care that the illumination is good.

A more careful prophylaxis is needed again when the period of presbyopia approaches. Convex glasses should then be early adopted, because if delayed too long it may sometimes lead to accommodative asthenopic troubles, ciliary neuralgia, and, according to Professor Schön, even to cataract and glaucoma. When disturbances of vision, even of trivial nature, begin at any age over forty years, we think more of the possibility of commencing cataract or threatening glaucoma than among younger patients. Nor must we forget that advancing years will expose the eye more to eye disease which results from arteriosclerosis and other diseases of the circulation.

In females there are the additional dangers of puberty and later of pregnancy, and of the puerperium and finally of the climacteric. Further details will be found in the chapter on prophylaxis in disturbances of the genital apparatus.



The Prevention of Disease of the Ear

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I. General Prophylaxis

In textbooks upon diseases of the ear, there are very few, if any, direct statements concerning prophylaxis against diseases of the organ of hearing, because these textbooks have to do with disease already existing; but indirectly much may probably be inferred as to prophylaxis from the aetiological factors given in these books.

A detailed account of this prophylaxis would appear to be the more needed because the anatomical relations of the organ of hearing do not tend specially to bring about recovery when that organ is diseased, but rather tend to prevent a cure, even when treatment has been employed. A further reason for prophylaxis is because the happiness and position in life of the patient may be much influenced by disturbances of the function of the ear, and lastly because the life of the patient may be endangered if the inflammatory suppurative process extend to the neighbouring structures, namely the base of the brain, the lateral sinus, the jugular vein or the carotid artery.

Tröltsch truly says that there is no other cavity in the whole body which is placed in direct contact with so many important structures as is the tympanic cavity—and this is saying so far as prophylaxis is concerned, "caveant ne quid detrimenti . . . . capiat."

The organ of hearing forms no exception, and its constituent parts may become diseased in the same way as any other organ or part of the body, not only primarily, but still more often secondarily by the extension of disease from elsewhere. For example, eczema of the skin

of the external ear may be primary; often however it extends to the ear by extension from the scalp or face; or again, especially in children with a delicate skin, it may be caused by irritating discharge from the middle ear. Similarly, catarrh and inflammation of the naso-pharyngeal mucous membrane may extend to the ear along the Eustachian tube; and on the other hand the mucous membrane of the tympanic cavity may be the so-called *locus minoris resistentiae* and be the site of a primary catarrh or inflammation. Here we have to consider not only the morbid structural changes in themselves but also the disturbance in the function of the organ which may result from them.

Obviously in this work we shall only describe those diseases whose cause or predisposing or exciting factors are known; those affections whose development and progress cannot as yet be hindered or checked in the sense of bringing them to a stand still or causing their retrogression, such as exostoses in the auditory passage, belong to pathology, and in so far as they cause functional or other disorders require to be therapeutically treated.

In general a hygienic life is a great protection against diseases of the ear. The ear should in my opinion be left alone as much as possible, and directly anything abnormal is perceived the surgeon should be consulted. There are people who imagine that the external auditory canal needs attention every time they make their often exaggerated toilet—that it must be kept absolutely clean and cannot be sufficiently cleaned even with an earspoon, a sponge, a hair pin, or a twisted corner of the towel. This seems to me injurious rather than otherwise and the ear should be let alone. Dirt should certainly not be allowed to lodge on the auricle itself. This can be best cleaned with the fingers, soap and water; the finger gets most easily into the recesses of the ear pinna and the auditory canal will only be included so far as the index finger can reach. Cerumen which is deeper than that is best left until it has made its way forward to the outer opening of the canal and can then be easily removed.

It is quite unnecessary to stop up the ear with wool when the ear is not inflamed, and it is only—as we shall see later—indicated under certain conditions. The tranquil layer of air in the auditory canal acts as a bad conductor of heat and protects the tympanic membrane from the external (low) temperature, and, generally, too, prevents water from completely entering the ear when the head is quickly dipped under water as in diving. Even the swimmer in the dorsal position need never let the head sink so low into the water that water gets into the ear; for this not rarely causes giddiness.

The commonest and most important ear diseases are those affecting the middle ear, and these mostly extend into the ear from the naso-pharynx by way of the Eustachian tube. Hence, we should whenever possible avoid all causes and occasions which we know from experience may produce affections of the naso-pharyngeal mucous membranes, or we should by early treatment endeavour entirely to prevent their extension to the ear, or, at least, reduce their severity.

Where these acute affections are ushered in by subjective symptoms which make themselves felt, patients of the better classes generally soon seek medical advice; the lower classes are unfortunately more indifferent to such symptoms or may first try some homely remedy, such as a warm compress on the ear, or the application of steam or the vapour of camomile or of mallow tea to the auditory canal, the head being wrapped up in a large cloth, and several thick layers of material covering the ear with the view of avoiding draughts. Generally I feel uneasy when I see a patient come thus—the slight alleviation of the pain obtained by this means is mostly at the expense of great softening of the tissues, profuse suppuration and extension of the inflammation. These patients are so weakened and reduced by it, that one has to examine them very quickly and carefully in order to obviate an attack of syncope. Still greater and more serious is the indifference shown in chronic purulent inflammation of the middle ear. Many factors combine to bring about this indifference: ignorance of

the importance of the disease, the superstition that harmful "humours" are eliminated from the body by the otorrhoea, the consolation of oldfashioned doctors that the otorrhoea will cease when puberty approaches, the fear of treatment, the refractoriness of children. There is often also the want of time and opportunity for treatment, especially in the country where people do not go to the surgeon till polypi as large as cherries or pigeon's eggs have grown from the auditory canal—and sometimes, in Germany, the prospect of being freed from military service.

And when a patient with ear disease comes under treatment for meningitis or pyaemia resulting from neglect of the ear trouble, and cannot then be saved, the right lesson is not even then drawn from the facts, but on the contrary it is thought—the patient lived a long time unhurt by his ear disease, and now that he puts himself under treatment he is getting worse. And thus many a man who has tried to escape military service through his neglected otorrhoea has died sooner than he otherwise would. I have seen, too, a young woman carried off by otorrhoeal meningitis after a few weeks of married life. Such tragic events cry aloud for prophylaxis and prophylactic teaching.

Fortunately the matter is not always so serious. Severe pain in the ear is often complained of; examination of the auditory meatus shows that there is no inflammatory change there, but we may find a carious molar tooth in the lower jaw, the pain being referred to the ear, and often so markedly that the patient seriously protests against the opinion of the aural surgeon that it is due to the dental caries. We would here therefore point out the need for attention to the teeth and their occasional examination and treatment by a dentist.

General hygienic measures will also prevent infection by tuberculosis and syphilis. Tuberculosis often attacks the structure of the tympanic cavity, the tympanic membrane, and the skin and cartilage of the auditory canal. Syphilis may in addition attack the nervous apparatus of hearing and cause complete deafness.

Prophylaxis against disease of the external, middle and

internal ear will be given; but we shall not be going beyond our task if here and there we add hints to prevent acute disease from developing into chronic disease, with all the serious consequences to the life and hearing of the patient which may result therefrom.

II. Special Prophylaxis

PROPHYLAXIS AGAINST EAR DISEASE IN CHILDREN DURING THE FIRST YEARS OF LIFE

Attention should be given to the ears of children even in the first year of life, and eczema intertrigo should be prevented by carefully drying the skin behind the ear, by using powder and by separation of the contiguous surfaces.

In regard to the pinna of the ear it should be noted that if it is pressed too much against the side of the head by tight-fitting hoods, the cartilaginous posterior wall of the auditory canal is thereby pressed forwards and the lumen of the auditory canal narrowed to a slit. This narrowing allows the cerumen to accumulate easily and frequently and disturbs hearing, and when there is disease in the remoter parts of the auditory passage it may be a great hindrance to treatment. On the other hand caps should not come down so low over the head or be pressed down so as to push the upper part of the pinna forwards and downwards. The thinness of the pinna and the great extent of surface make it very susceptible to frost bite, and it should therefore be protected against this. The power of fashion and the vanity of women are far too great to permit us to hope that the custom which has descended from a barbarous age of piercing the lobule of girls' ears for earrings will soon disappear, however greatly it may be desired to prevent the ill effects often observed: these are infection, obstinate eczema, ulceration and loss of substance of the lobule, tearing out of the ring from the hole and splitting of the lobule, frequent inflammation with formation of abscess, development of keloid and fibromata. Moreover, it is very

unsightly when the lobule is pulled down by the weight of heavy earrings, and the hole becomes an ugly slit.

The tympanic cavity of the newborn child is still filled with foetal structures which soon become absorbed: this causes a certain irritable condition of the tympanic mucous membrane; moreover the Eustachian tube in the child is shorter and wider than in the adult. These factors produce a somewhat greater predisposition to involvement of the middle ear when there is any affection of the naso-pharyngeal mucous membrane. This must if possible be prevented by care in bathing the child and in taking it out of doors.

In consequence of the communications between the tympanic cavity and the cerebral meninges through the connective tissue in the wide petro-squamosal fissure, acute inflammation of the middle ear in children is often accompanied by cerebral symptoms; and when there are such symptoms the ears should always be examined, as Tröltsch points out, especially when there is no sufficient cause to be found in other organs.

The mastoid antrum and tympanic cavity form almost one continuous cavity in the child's temporal bone, and the antrum becomes therefore much involved in any inflammation of the tympanic cavity and great attention should be given to the mastoid region. Inflammation of the soft tissues over the mastoid and fluctuation are indications for early incision or opening up of the mastoid process to prevent necrosis. For the otorrhoea the insufflation of boracic acid is less useful in children than in adults because the narrowness of the auditory canal makes the application difficult; the dropping in of astringents is more suitable and gives better results.

It is very important to test early the child's power of hearing and to make sure that it reacts to sound, and if there is any doubt about it to have the ears carefully examined. It may happen that some latent disorder, such as catarrh in the middle ear, may more or less prevent the conduction of sound to the labyrinth, and that the nerve apparatus for hearing will thereby be retarded in its functional development, a want which, if early enough recog-

nized, may be removed by suitable treatment, but if untreated may lead to further loss of hearing power. These children do not learn to speak till late and then indistinctly, and in severe cases may almost resemble deaf mutes. There may in these cases be some mental weakness or idiocy (psychical deafness), and we must determine how far inability to hear is a cause of the symptoms.

Still more urgent is the early and repeated examination by a surgeon of children who belong to families in which so-called nervous deafness or difficulty of hearing occurs, or who come from marriages between blood relations, and about whose power of hearing there is some doubt; because here too the cause is often some defective development and we can hope for a better result if the proper treatment is commenced early.

PROPHYLAXIS AGAINST AFFECTIONS OF THE EXTERNAL EAR

It was probably less the slight painfulness of a pull on the pinna than the ease with which it can be reached and laid hold of, which in earlier times, and often even now, induced many, especially masters and workmen, to take their subordinates "by the ear." The ear should, however, never be pulled forcibly; laceration, fracture of the cartilage or haematoma, if there is a predisposition to it, may be the results. It may be serious for the ear, and even for the life of the patient, if a foreign body lodge in the auditory passage, whether it got in through play, intentionally, or by some accident. With the exception of molten iron, lead and boiling corrosive fluids, the mischief is scarcely ever caused by the foreign body itself, which may often remain in the ear for years without producing any disorder, but by the unsuccessful attempts at extracting the body which are made by unskilled hands. These rough attempts may produce excoriations of the walls of the auditory canal with otitis externa, the formation of granulations and polypi, rupture of the tmypanic membrane and fracture of the auditory ossicles, otitis media, inflammation of the labyrinth and meningitis.

Many a young life has been sacrificed in the attempt to remove a seed harmless in itself.

Whether in children the warning not to put foreign bodies into the ears acts as a suggestion to do it must be decided by the teacher.

In whatever way a foreign body may have entered the auditory canal, for unskilled hands it is much better left untouched. The surgeon who is versed in ear disease will first convince himself that there is a foreign body present by examining the ear with the aid of a mirror, because often a search has been blindly made for a foreign body which was not there. If it is necessary to introduce a speculum, this as well as all other instruments that are used should be cleansed in strict accordance with the requirements of asepsis. The speculum must be inserted carefully and not far, in order that the foreign body may not be pushed in farther, and without further examination with the probe the surgeon directs a stream of water with a syringe and washes away the foreign body by this harmless method. But if wrong manipulations have already pushed the foreign body deeper, and it is wedged in, one must not hesitate to get expert help. Often it is still possible to remove the foreign body by repeated syringing, aided perhaps by slight anaesthesia and the cautious use of a suitable hook, and when this is not possible treatment is indicated for the commencing inflammation, so that the swelling may be removed, the auditory canal be widened and the foreign body previously impacted be thus set free. If inflammation of the middle ear and suppuration have set in, dangerous extension of the inflammation to neighbouring parts must be prevented and operative interference should not be delayed, particularly when the foreign body hinders the free discharge of the pus. In connexion with this subject, we must try to remove the custom which is so common among the lower classes of putting things into the ear when they have toothache, such as garlic or camphor; they probably do not remove the reflex pain, and if the patient is anxious about the foreign body and unable himself to get it out, he often falls into the hands of

officious persons and may be injured. It has also happened that a man suffering from toothache has taken a piece of wool soaked in creosote to put into the hollow tooth, and has by mistake put it into the ear and caused serious corrosion and ulceration. The "pure almond oil," which is so often dropped into the ears of children when they complain of pain, does more harm than good, because it lets time go by which should be used for rational treatment. This is still more true about those much praised ear-oils and balsams which often set up irritation, provide a suitable soil for fungi and produce parasitic otitis externa.

Under ordinary conditions it is as a rule not necessary to put cotton wool into the ear; indeed it is better not to do so because the loose fibres of the wool remain behind, cause itching and irritation, and with the wax form firm masses in the ear.

There are people who are in the habit of putting cotton wool into the ear. They often forget they have already put in a piece, or, thinking it has fallen out, they put in a second and later a third piece into the ear, so that the first piece is pushed further and remains there till, encrusted with cerumen, it acts as a foreign body, producing deafness and noises in the ear and making the patient seek for help.

Much more harmful is the habit of putting things into the ear such as earscoops, sponges, matches, toothpicks, hairpins, needles and knitting needles, penholders and pencils, whether to clean out the ear or to scratch it. The mere touching of the deeper parts of the posterior wall of the auditory passage produces a reflex sensation of tickling in the throat and coughing, a plain hint that it should not be done.

Such manipulations, often practised from bad habit or thoughtlessly, may have very unpleasant consequences. For example a piece may be broken off or loosened from a match, a toothpick, or a pin with a glass or bone head, or pencils with bone or metal tops; and it has often happened that when the object has broken, the top, or a piece of it, has remained in the ear as a foreign body. Moreover, any

cerumen which is in the ear will be pushed in further by these instruments, and the passion for scraping the walls of the meatus may easily cause eczema, excoriations and otitis externa. But there is also the danger that this manipulation may rupture the tympanic membrane and suddenly plunge the stapes deeply into the foramen ovale, which generally produces momentary unconsciousness, giddiness, noises in the ear and deafness, and sometimes suppurative otitis media.

By avoiding these manipulations or scratching the auditory canal with the finger nail we shall at least not be assisting the development of otitis externa. But if from some other cause this is already present, early treatment is required to check the extension of the inflammation, and the patient should not discontinue treatment until the physician has examined the ear to see that the disease has quite healed. For it is possible that the granulation tissue remains and keeps up suppuration, though the patient is not aware of anything except that the "ear wax" has altered and is soft, greenish yellow, and has an offensive smell. This is inspissated pus which proceeds from the granulations and covers them.

The prophylaxis of diffuse otitis externa will be given later under otitis media, in the course of which it generally appears.

Eczema of the external ear, though in itself a trivial skin affection, must not be treated lightly or neglected. The fissures often produced by it, especially in the incisura intertragica, are not seldom the starting point of erysipelas, and chronic eczema may lead to considerable thickening of the skin of the meatus and of the auricle.

THE PROPHYLAXIS OF DISEASE OF THE TYMPANIC MEMBRANE

The tympanic membrane is protected in general from disease and direct injury by reason of its deep position at the inner end of the auditory passage. Primary inflammation is indeed rarely met with, and then only in individuals

with an exposed broad and short auditory canal, when the tympanic membrane is struck by a current of cold air or cold water. In regard to this an exception may be made to the rule of not stopping the ears with cotton wool, for in these cases it is sometimes a wise precaution to use a plug of wool in the ear when dipping the head under water or driving in an open carriage, on board ship when a keen cold wind is blowing into the ear, or when the auditory canal is wet after having been syringed and after bathing. Direct injury and rupture of the tympanic membrane may be prevented by avoiding the cause, namely scratching the auditory canal with pointed objects such as toothpicks or knitting needles. Nevertheless, it has happened to many that in a thick undergrowth a twig has got into the ear and has penetrated the tympanic membrane. It may also easily happen when one lies on the grass or on straw or hay that a blade gets into the ear and pierces the tympanic membrane.

On the other hand the tympanic membrane may be indirectly injured by being ruptured when exposed to any sudden condensation of air in the auditory canal, by a blow on the ear, by diving into the water and by sudden rarefaction of the air from kissing the ear near the external auditory meatus. In raising the pressure of the air by blowing through the Eustachian tube (Politzer's method) and in rarefying the air in the auditory canal care must be exercised, because an atrophied and scarred tympanic membrane may easily be torn. For the former the air bulb must only be gently compressed and the patient told at the same time to press the finger well into the auditory canal in order to some extent to exercise a counter pressure; for the latter we must employ very slight rarefaction only.

But in all cases of rupture of the tympanic membrane where the hole gapes open one should simply close the auditory canal with a piece of sublimate gauze and await events. In order that secondary inflammation of the middle ear may be prevented no drops should be put into the ear, and it should not be syringed unless it is unavoidable. When a more careful inspection and description are necessary for giving a certificate, one must carefully so far as is

possible remove flakes of epithelium and cerumen with forceps and wool.

When patients believe that the ruptured tympanic membrane cannot heal without some application, and it is feared that for that reason, or with a view to claiming higher damages for the injury, they will make use of something which might cause consecutive otitis media, then it is best to prescribe some simple ointment to rub round the ear and to put on a protective bandage. Even a commencing consecutive inflammation may be checked by suitable treatment and by not irritating the parts by putting in drops. Most ruptures of the tympanic membrane may be regarded as injuries of very slight severity.

Not only must we prevent rupture whenever possible, but we must also prevent everything which may lead to relaxation of the tympanic membrane or tension of it wherever there is a tendency to it as the result of some previous pathological process, as frequent forcible blowing of the nose, the abuse of Valsalva's method by the patient to improve his hearing, too long continued treatment by catheterization, and too vigorous so-called massage of the tympanic membrane by compression and rarefaction of the air in the external auditory meatus. It is especially the posterior superior quadrant of the tympanic membrane that is most affected by increased pressure in the middle ear and is finally bulged out in the form of a pouch, an overhanging sac, or the finger of a glove turned inside out. When the pressure diminishes the relaxed part falls back just as deeply towards the tympanic cavity, and lies against the incus or head of the stapes, and by pressure upon the head of the stapes gives rise to subjective noises and disturbances of hearing. Relaxed scar tissue may become so loose that it moves with any slight variations of air pressure in the tympanum, such as occur in breathing and in swallowing, and may cause the patient much discomfort.

PROPHYLAXIS AGAINST AFFECTIONS OF THE MIDDLE EAR

The prophylaxis against diseases of the middle ear is, so far as catarrh and suppurative otitis media are concerned,

identical in general with the prophylaxis against those diseases in which the ear becomes affected by extension of inflammation, as in the various affections of the mucous membrane of the respiratory tract, and the acute infective diseases, scarlet fever, measles, smallpox and diphtheria, and we may therefore refer the reader to the sections dealing with these diseases. And yet we cannot avoid mentioning here that which specially applies to the ear.

Catarrh and suppurative otitis media seem clinically in their typical form and severity to be different diseases; yet between these two main types there are a number of other stages, transition forms. We do not yet know definitely why in one case the effect of the virus should cause catarrh, and in another case suppurative otitis media; indeed the disease may commence as an acute otitis and then becoming less intense run its further course as a catarrh, or vice versa. Doubtless this depends upon the intensity and duration of the action of the virus, the number and virulence of the micro-organisms and the power of reaction of the organism. Prophylactic measures must be directed against both these forms. With children, especially fair children with a delicate complexion, one must begin to fight against the predisposition which most of them have to catarrhal disease of the respiratory tract by hardening the body and attending to the general bodily health. Daily a short cold rubbing down of at least the upper part of the body and arms, brisk movements in the fresh air, though not in very wet cold weather, fog or mist. Swimming, gymnastics, and brine and sea baths, according to the season, are of value. The clothes should not be too heavy or too warm. The feet should be kept dry and warm, and sudden changes of temperature should be avoided. When necessary, iron, cod-liver oil and appropriate mineral waters may be administered. These are the ordinary measures to be adopted. Moreover it is necessary to warn against sitting too long out of doors in gardens or places of amusement when the ground is damp, as in spring and autumn, or in the cool evening air after sunset.

Hypertrophy of the tonsils, adenoid growths, abnormal

conditions of the nasal passages, such as deviation of the septum, or polypi which obstruct the free entry of air into the naso-pharyngeal space and necessitate respiration through the open mouth, are further causes for frequent attacks of sore throat and of catarrh of the tonsils, throat and middle ear. Removal of the tonsils and of the adenoid growths is therefore to be recommended, especially where there is excessive growth of these structures. When there is only moderate hypertrophy we may rely upon medical treatment and the prospect of spontaneous retrogression of this lymphoid tissue. Palliative treatment of the catarrh of the middle ear by blowing in air may also be employed.

When there is acute naso-pharyngeal catarrh its extension to the middle ear should be if possible prevented by keeping the patient at home in a moderately warm room, by the use of gargles and the insufflation of boric acid powder. Violent blowing of the nose, whereby the alae are pressed against the septum and then forced open by the expulsion of air from the pharynx—as is so often done—should be avoided, because infective matter is possibly thereby driven into the middle ear and passive hyperaemia also set up. The nose should be blown in such a way that first one ala is pressed against the septum to close the naris while the air is expelled through the other open naris, and the same process then gone through on the other side.

Patients who do not consult the physician for an acute nasal catarrh or pharyngeal inflammation, wait to allow their middle ear catarrh to heal naturally. But the anatomical relations of the ear are not very favourable to healing: rather do the catarrhal changes in the ear tend to persist. Frequent attacks, whose course may be still further protracted by the hypertrophy of the tonsils and adenoids above mentioned, are mostly the cause of chronic middle ear catarrh, and early appropriate treatment is therefore required for middle ear catarrh and naso-pharyngeal affections. In regard to the latter certain precautions are necessary; thus for example if Weber's nasal douche is to be used high pressure should be avoided so that no fluid shall get into the middle ear. It is even better to wash out

the nose with a syringe. The reaction caused by a vigorous use of the galvano-cautery, especially near the seat of the pharyngeal opening of the Eustachian tube, or by examination, or by a posterior nasal plug, may extend to the middle ear and produce catarrh or otitis media. Another source of injury which may extend to the middle ear from the naso-pharyngeal mucous membrane is the abuse of tobacco (especially cigarettes) and snuff taking; the latter custom is no longer so common as formerly, and is adopted only by certain classes and trades.

We must not here omit to mention the importance of the appointment of school physicians, so that the ears of school children may be examined. Middle ear catarrh, especially so-called tubal catarrh which runs a more latent course, has to be considered. While middle ear inflammation soon reveals its presence by otorrhoea, this on the other hand gives a feeling of obstruction in the ear and of subjective noises to which less attention is paid, and when these children fail to hear many things and often ask questions, it is at first ascribed at home and at school to inattention and distraction. The child is backward in its work at school, and finally the parents begin to think that the child's hearing must be bad, or the teacher asks that the child may be seen by a surgeon. But often a whole school year is thus wasted, and this would be prevented if the children were examined by school physicians at the beginning of the term or from time to time.

If as stated above it is necessary to prevent catarrh of the naso-pharynx from extending to the ear, this is still more necessary in the case of severe inflammatory processes in the naso-pharynx which may set up suppurative otitis media, a very serious disease which may even endanger life. The remarks made above are applicable also here.

In order that an acute inflammation of the middle ear may run a favourable course without any complications it must from the very beginning be treated properly, and it appears therefore desirable to examine the ears from time to time during the course of acute infectious diseases in which the naso-pharyngeal mucous membrane is affected

to see whether there is any commencing involvement of the middle ear, and thus avoid being surprised later by an otitis which has spread to the mastoid or by an otorrhoea.

If the otitis media has already commenced, with violent pain in the ear, I consider it best, in order to prevent complications, to treat it with sedative measures and to avoid any further irritation. Cold is first to be applied by cold compresses or Leiter's tubes round the ear, chiefly to the mastoid, to subdue the inflammation and prevent its further progress. But as before stated the cold must be applied from the very commencement of the inflammation, although there be as yet no tenderness over the mastoid process or pain in it. The cold is applied rather to prevent inflammation, and it is generally too late to begin the application of cold when the inflammation in the mastoid cavity is already marked and causes pain. The treatment must be aided by suitable diet, rest, avoidance of bodily exertion, and of stimulating food and drink, and by regulation of the bowels.

Among sources of irritation to be avoided are the application of steam by a funnel in the ear which is still much used by some people, and the application of hot poultices to the ear: both rather favour the spread of the inflammatory process and suppuration.

There is a growing opinion now that it is best to avoid the use of narcotic liquids in the ear, because their analgesic effect is but slight and they tend to produce maceration of the cutis of the auditory canal and tympanic membrane, and because—may I add—one is apt to think enough has been done when this has been prescribed, and the most important part of the treatment is neglected. It is difficult to avoid the thought that this is the reason that acute otitis media is accompanied by such serious complications threatening life and necessitating operative interference. The pain may be relieved in other ways, as by using narcotics in the form of ointment round the ear or internally to ensure a night's rest, and moreover the pain is best removed by the application of cold. Treatment by cold and the avoidance of all direct irritation are the chief measures until the inflammatory process has commenced to subside;

the auditory canal should be lightly stopped with wool or sublimate gauze and nothing be dropped into the ear.

By this treatment the inflammation often passes off in a few days without leading to perforation or otorrhoea, a course which compared with those cases in which a long lasting otorrhoea occurs may be termed abortive. Paracentesis is generally indicated only in acute empyema of the tympanic cavity where the tympanic membrane is less involved in the inflammation and fever is present. In performing paracentesis I enter the knife at the lower half of the membrane horizontally and fairly near the periphery. One should avoid pricking the inner wall of the tympanum, because cases are known in which the sinus of the internal jugular vein has been punctured and haemorrhage has followed.

If there is already discharge from the ear one should merely insert pieces of perchloride of mercury gauze to soak up the exudation, and renew these very often. Pieces of wool are less suitable for the purpose because fibres readily stick to the sides and set up irritation, and may cause such undesirable complications as eczema, otitis externa, and even erysipelas. If the ear is to be syringed out once or twice a day it is best not to add any antiseptic to the water; these antiseptics are too weak to have any antiseptic action, and yet strong enough to cause irritation.

Boracic acid powder must not be blown in until the otorrhoea is no longer profuse. When there is swelling of the mastoid process it may be painted once a day with a mixture of equal parts of iodine and tincture of galls.

In severe cases of otitis media, when failure to hear the ticking of a watch held against the head shows that the labyrinth is also affected, as in scarlatina, measles and diphtheria, one should give sodium iodide internally directly the general condition of the patient admits it.

Under this treatment I have seen suppurative otitis media even in severe cases subside in a very short time without any complications, and during twenty-three years I can call to mind only two cases in which a temporary paresis of the facial nerve occurred, and only two patients, who by-the-bye did not strictly carry out the treatment prescribed, in

whom the mastoid antrum had to be opened up by operation, while many a case which otherwise would have been operated upon has healed under this treatment without any operation.

The most frequent complication of suppurative otitis media is extension to the antrum and mastoid cells, which often cannot be cured till the cavity has been opened by operation and surgically treated.

This operation is distinctly indicated when there is swelling of the soft parts over the mastoid, deep seated pain in it, bulging of the posterior superior wall of the auditory canal, and persistent high temperature, after a brief trial of conservative treatment. But one must not delay the operation—though no fever or pain be present—when other symptoms make it certain that there is pus in the mastoid cells and that cure without operation cannot be expected.

The early opening up of the mastoid process not only makes the diseased area accessible to surgical treatment, but prevents also the extension of caries of the bone by extension of the inflammatory process, affection of the cranial cavity, the lateral sinus, the cerebral meninges, or the brain itself, or extension along the sterno-mastoid muscle and burrowing of pus. If in the course of acute otitis media symptoms of sinus phlebitis appear, it may perhaps be still possible to check the process by freely laying open the mastoid cavity and opening the lateral sinus; while for symptoms of cerebral abscess trephining and exploratory puncture are indicated in order if possible to save the patient's life.

PROPHYLAXIS AGAINST CHRONIC PURULENT INFLAMMATION OF THE MIDDLE EAR

Chronic purulent inflammation of the middle ear is generally the result of acute inflammation, and the best prophylaxis against it will be early rational treatment of the acute otitis media, together with the endeavour to check and eliminate all factors which tend to make the inflammation chronic, such as the formation of large granulations or polypi during the acute inflammation, and extension of in-

flammation to the antrum, and treatment should be continued till the disease has been cured.

Under such conditions chronic purulent otitis media would soon become less common. We are nearer this goal today than formerly. The study of disease of the ear does not yet take the place it should in the medical curriculum, and is not an obligatory subject of teaching or examination; nevertheless there are cliniques and professional chairs for its study, and students and doctors endeavour to familiarize themselves with the study by their own wish and because they recognize the need for it. The fact that this knowledge about ear disease is becoming more common among medical men, and that the advances made in surgery have considerably helped this special branch of medicine, and enabled us to treat more effectively purulent inflammation of the middle ear, makes it more easy to fulfil the requirements of the prophylaxis described above: thus, to give an example, while formerly the extension of the inflammation to the mastoid antrum prevented the healing of the otitis media and caused it to become chronic, now in such a case we should during the course of the acute inflammation open up the affected part and cure it before it has had time to become chronic. But it is not possible always to exclude all circumstances which tend to make the process chronic in a given patient, and some cases of chronic otitis media will therefore always remain to be treated. In reference to these it is essential that they should be submitted to rational treatment as soon as possible in order to prevent future dangers. Two factors however stand much in the way in connexion with this. First there is the lamentable indifference shown by patients who have ear disease, particularly when it gives no pain and has affected one ear only, so that it does not make any very great difference in their power of hearing. This indifference may perhaps be in part owing to the former lack of aural surgeons and the hopelessness of much of the treatment. Also there is still a widespread prejudice amongst people against stopping a discharge from the ear lest it should "strike inwards," which makes many hesitate to be treated early, and many a life has been sacri-

ficed which might have been saved by proper treatment. How greatly this theory of "striking inwards" formerly fettered the mind is shown by Tröltsch, who tells us that in the early days of his medical work, after a chronic purulent otitis media had been healed, he put a seton in the arm and thus kept up suppuration for a time longer.

In the course of a chronic purulent otitis media there is often a stage in which less pus is formed and the ear no longer "discharges," but the pus becomes inspissated in the deeper parts and forms a crust which adheres firmly to the surrounding parts and causes the retention of any fresh pus which is being slowly formed. This retained pus, containing micro-organisms, sets up irritation, the inflammation and suppuration are increased, and the increased tension of the pent-up secretion produces pain, dizziness, and fever, till the pressure is great enough to overcome the obstruction and the pus escapes. With the re-establishment of the discharge the symptoms again disappear. Herein lies the grain of truth upon which the prejudice is founded. Certainly so long as there is suppuration the escape of the pus should not be obstructed, and there should be an easy and free outlet for it; but the inflammation should be cured so that the formation of pus ceases, and then there need be no fear of any "striking inwards," or to express it correctly any extension of inflammation to neighbouring parts, transference of micro-organisms, or of septic thrombi. There may be many who have chronic otorrhoea the whole of their lives and suffer no ill effects; but there are others again who lose their lives by the dangerous sequelae. To prevent these sequelae the disease should be treated as early as possible. It is to be hoped and indeed there are already signs that this indifference and prejudice will gradually be overcome by the spread among the people of a knowledge of the danger of the disease, of the necessity for early treatment and of the possibility of cure, and the good results which follow operative interference in these cases of chronic otorrhoea.

Narrowing of the external meatus will also be prevented,

for in the case of children where neglected chronic otitis media after scarlatina often leads to inflammation of the outer ear and thereby to hyperplasia of the walls of the external auditory meatus, narrowing of the auditory canal will occur. Such a stricture which sometimes barely admits the point of a probe makes it difficult for pus to escape from the deeper parts and leads to the formation of masses of retained secretion. Moreover it makes it impossible for the ordinary treatment to be carried out, and in order to cure the disease the stricture must first be removed by a radical operation.

Early treatment of chronic otitis media will generally also prevent caries, necrosis, paralysis of the facial nerve, and the formation of polypi; but if these are already present in any case which has been left to itself, they must be treated at once by operative interference and by drugs, because they keep up suppuration and prevent the free escape of pus. Care must be exercised in the use of the galvano-cautery.

When the inflammation is chiefly in the mastoid process or in the upper part of the tympanum "the attic," and shows its presence by foetor or by pus flowing from the aditus ad antrum, or appearing through a perforated membrana Shrapnelli, or by cholesteatomatous masses which come away from these parts, while very slight or no inflammatory changes can be seen in the tympanum itself, then the so-called radical operation is indicated as prophylactic in its proper sense. By removing the posterior upper wall of the external auditory canal and outer wall of the attic and remnants of the tympanic membrane, the malleus and the incus, the auditory canal, tympanum and antrum are thrown into one, and the danger of the spread of the inflammation to the interior of the skull is considerably lessened, because the inflammatory focus is now accessible for treatment, and the products of inflammation can freely be discharged.

But at a time when the patient has no longer any trouble arising from the diseased ear except a slight otorrhoea, which often apparently ceases altogether for a time, he

does not easily make up his mind to undergo a trying operation in which there is also the fear of an anaesthetic and other factors; and since the possibility of cure by conservative treatment is not altogether excluded, the latter method of treatment is for a time tried in the more favourable cases. The more favourable conditions for the conservative treatment are cases of chronic inflammation of the upper part of the tympanic cavity, where there is a very wide auditory passage, and the parts can be easily touched and syringed without causing giddiness, and the patient can come as often to the surgeon as he thinks necessary.

In this treatment I prefer also to remove the malleus and even the incus when I suspect caries of these bones. Even if these are found after removal to be free from disease, yet more space has been secured in the upper part of the tympanum and treatment is easier.

By pointing out to the patient quite early that he is being treated conservatively because he cannot make up his mind to undergo an operation for prophylactic purposes, the surgeon will to some extent reduce his own serious responsibility and let it rest partly upon the patient.

But where there are unfavourable conditions: a very narrow or constricted auditory passage, discharge of pus or of cholesteatomatous masses from the antrum or attic, and headache or giddiness, then a prophylactic operation must be more decisively urged and the responsibility of delay of operation be placed entirely upon the patient, because the morbid process often progresses in a more latent form towards the cranial cavity, and sets up morbid changes there which when they have led to symptoms make it too late for operative interference to be successful.

Rigors and cerebral symptoms in the course of a chronic purulent otitis media, when not referable to some other disease, but due to sequelae of the otitis media, are indications for radical operation to save life, and trephining of the skull as an ultimate resource.

It goes without saying that in operative interference with the mastoid process, especially in radical operations,

great care must be taken to guard the canal of the facial nerve (Fallopian canal) and the horizontal semicircular canal from injury, and that the strictest asepsis is needed for the operation and the after treatment.

Besides this vital importance of purulent otitis media we have also to take into consideration the functional disturbances caused by it; here again early treatment is required as prophylaxis, and in suitable cases an artificial tympanic membrane may be tried.

PROPHYLAXIS IN DRY PERFORATION OR DESTRUCTION OF THE TYMPANIC MEMBRANE

After the healing of chronic inflammatory catarrhal or purulent middle ear disease, the loss of substance in the tympanic membrane is, especially in adults, rarely replaced by scar tissue.

Although the mucous membrane of the inner wall of the tympanum, when the tympanic membrane is destroyed, may undergo epidermoid changes, and thereby become more capable of offering resistance, nevertheless it is advisable as a matter of prophylaxis to avoid all external injurious factors and prevent recurrence of the inflammation. Such patients should be advised to wear a piece of wool in the ear in bad weather, not to let water get into the ear, not to dip the head under water when bathing, and not to use any drops or syringing for the ear. In such cases I myself prefer to avoid syringing the ear, and try to remove any crusts and masses of cerumen in the auditory canal by forceps or curette, especially when the perforation is situated high up.

The artificial tympanic membrane may also set up irritation and in cases where the hearing of the other ear is good its use is not indicated. On the other hand the recent method of touching the edge of the perforation with a weak solution of trichloracetic acid is often successful in closing the aperture by scar tissue, and is thus of prophylactic value in protecting the tympanum.

PROPHYLAXIS IN OTITIS MEDIA WITH SCLEROSIS

The obscurity as to the causes of otosclerosis has not yet been cleared up; prophylaxis cannot therefore, properly speaking, remove the causes; yet clinical experience has taught us many facts with reference to this disease. First there is an hereditary factor which seems to be concerned in by far the greater majority of cases. We do not mean to imply that otosclerosis should be looked upon as a hindrance to marriage, though the severer forms of otosclerosis should be considered. It would seem moreover that excessive cold bathing in rivers and in the sea, energetic hydropathic treatment, many cold douches upon the head, may cause the disease to appear earlier or in a worse form in people who have an hereditary tendency to it, and that it may spontaneously produce the disease in people among whose relatives otosclerosis is not known. In these matters caution is therefore advisable, and people who are predisposed to otosclerosis should avoid these things altogether.

In women who have otosclerosis, quickly recurring pregnancies have an unfavourable effect upon the disease, and hearing often becomes worse after each childbirth. Everything too should be avoided which is associated with active or passive hyperaemia in the head, such as long continued work with the head bent forward, or in a stooping position, and prolonged mental exertion at night.

In cases where the disease is already present, prophylactic treatment should be adopted to check its further progress, and in order not to frighten the patient from the treatment by the unpleasant and often painful method of catheterization the Politzer method should first be used.

If later treatment by the Eustachian catheter is resorted to, a new catheter should be used if possible, which the patient may himself buy and bring with him, or a well disinfected catheter should be used and kept during the whole time of treatment for that particular patient. Catheters which have been used for syphilitic patients should not be used, even after disinfection, for other patients.

We must proceed very gently in catheterization to avoid

haemorrhage, and we should not let the patient get faint, and therefore he should not be allowed to stand, and help should be early given. The development of submucous emphysema must be prevented by holding the catheter firmly with the left hand, the right hand, which is used to squeeze the ball, should not be pushed forwards, and any resistance to the empyting of the ball should not be forcibly overcome.

Before the introduction of a catheter, which is generally made of celluloid, it must first be examined to see that it is perfect. If on inserting the catheter one meets with resistance, the kind of resistance must determine whether it is fixed in the isthmus or is pressing against the wall of the tube; in the latter case efforts to push it further would produce a false passage. After passing the catheter the ball should be gently emptied, otherwise emphysema is rapidly produced. In injecting fluids through the catheter we must beware of producing too great a reaction, thus setting up inflammation of the middle ear. Upon the whole the length of period of treatment should not exceed four to eight weeks; longer treatment might again diminish any good result gained in the power of hearing. When these patients use ear trumpets we should, in selecting one, make sure that the sound is not too piercing and metallic for the patient, and that in speaking into the tube one should not come too close or speak too loudly.

PROPHYLAXIS FOR AFFECTIONS OF THE NERVOUS APPARATUS OF HEARING

Statistics show that congenital deafness is common among children born of consanguineous marriages, and that there is also an hereditary factor, for parents who were previously not related to one another may have a child with congenital deafness if there is in the father's family, or more often in the mother's family, a case of deafness, for example a child of a sister of the mother may be deaf. Here I will merely say let the reader draw his own conclusions from these facts. Nevertheless deaf and dumb parents have brought forth

children with normal powers of hearing. If these children are to develop their powers of hearing and speaking early, they should be brought up amongst people who can hear well.

Alcoholism in the parents—most probably in the father—and conception during drunkenness are also said to cause congenital deafness in children. Moreover a connexion has been pointed out by Bischer between congenital deafness and certain conditions of climate and soil. These conditions are an isolated mountain district, with much intermarrying of the population and the soil formed of the strata of the trias formation. We have already said that if there is any doubt about the child's power of hearing it should be examined by a surgeon, and we must here again point out that in affections of the organ of hearing as the result of acute infective diseases, such as scarlatina, diphtheria and measles, early energetic rational treatment is urgently needed, with the use of sodium iodide internally. For these diseases often endanger the power of hearing through involvement of the nervous apparatus of hearing, and are the cause of most cases of acquired deafness. This early treatment will make it possible to prevent the harmful consequences, such as necrosis of the auditory ossicles, inflammation of the labyrinth with formation of connective tissue and ossification, necrosis and casting off of the necrosed cochlea and semicircular canals, and so prevent deafness. Early treatment is also essential for affections of the nervous apparatus of hearing in serous meningitis and epidemic parotitis, in cases where it is not possible to remove the children in time from the infected district. In cases of acquired deafness in order to save any power of hearing which still remains, the capacity for hearing should be tested, and if there be any, then exercises in hearing should be practised to maintain and improve the power of hearing that still remains. Children who had learned to speak and to read before they became deaf should be made to read aloud, and should also be compelled to speak by paying no attention to them when they point or make indistinct sounds; they will then not so easily lose their vocabulary of words and so not lose their power of speaking.

Recently, too, the very sensible suggestion has been made, and in some places has already been carried out, that in institutions for the deaf and dumb aural surgeons should examine the pupils on admission, determine the treatment to be adopted, test their power of hearing, and, if any be left, devise exercises in hearing for them.

There are also other diseases, such as anaemia, cerebral congestion, syphilis, leucaemia, diabetes, nephritis and malaria, in which the nervous apparatus for hearing may be sympathetically affected, and in these also early diagnosis and appropriate treatment and care may save the auditory nerve from further injury.

Apart from rough shocks to the auditory nerve by blows and falls upon the head, the unexpected sound of the firing of a gun, or by rarefaction of the air through leaving a diving bell too quickly, there are also certain occupations the noise of which so acts upon the ear that the auditory nerve, stunned for weaker sounds, becomes less susceptible to them: the so-called "occupation deafness" which locksmiths, blacksmiths, tinsmiths, coppersmiths and workers in manufacturing machinery develop in course of time. In such cases it would be advisable to damp the excessive sound by putting wool into the ears.

The organ of hearing of the engine driver is also in time affected by the shrill whistling and the bad weather to which these people are exposed; in these cases wool cannot be well used to stop the ears, because they require good hearing to control the movement of their engines, and to hear warning signals. The auditory nerve may also be affected by rheumatic affections such as those which attack the facial nerve, and these may produce temporary or permanent paresis, or paralysis, or deafness. The same thing may occur when a person who is overheated remains in a current of cold air, as in driving in an open carriage with an uncovered perspiring head. We must not only try to prevent such injuries, but when they have occurred must at least adopt appropriate treatment immediately. So too in Ménière's disease and in acute inflammation of the membranous labyrinth early diagnosis and treatment are of

great importance in preventing permanent injury to hearing.

According to Weber and Liel the power of hearing is considerably weakened by onanism.

Lastly mention must be made of the wellknown effect upon hearing of quinine, sodium salicylate, salol, tobacco and alcohol, and caution is therefore needed in their use, and a special warning must be given against alcohol. The hearing is also exposed to similar injuries by various poisons used in trades, as in poisoning by lead, mercury, arsenic and nitrate of silver.

The Prevention of the Diseases of the Teeth and Mouth

BY

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The Prevention of the Diseases of the Teeth and Mouth

During the brief period of barely half a century the art of dentistry, which had then as its object the removal of unsound teeth and the substitution of artificial teeth, has now developed into the highly valued science of dental surgery. The advances made have been so great that a scientifically educated man needs to devote himself wholly to the subject in order that he may be well versed in all its various branches. The general practitioner cannot easily follow up all the advances made in special branches, yet the subject is of such importance that the following remarks about the prophylaxis of diseases of the teeth and mouth will be very acceptable.

Daily experience shows that the general practitioner does not give to diseases of the mouth and teeth the consideration which they merit; yet the early treatment of these, or the sending of the patient to a dentist, might prevent many a trouble. But this is by no means the only reason why so many people suffer from their teeth. One of the chief reasons is that the true aetiology of many diseases of the mouth is still unknown. This is the case with the so-called caries of the teeth, which affects more than 80 per cent. among civilized races. And further our ignorance arises partly because so few authorities have studied the question, and very largely because the science of dental surgery is still so recent. There is a wide field for further inquiry here.

I. General Prophylaxis

It is well known that sound teeth and a healthy oral cavity are necessary conditions for general good health. The days when teeth and mouth washes were regarded merely as cosmetics are past, or at least should be past. In the daily use of these washes at stated times we have, so to say, the whole of the general prophylaxis and hygiene of the oral cavity, and the meaning of this I will explain in the following brief remarks.

Even in the healthy state the oral cavity is, to use Miller's expression, an almost ideal nutrient medium for micro-organisms. In pathological conditions other additional factors come into play which are favourable to the growth of bacteria, namely the dentine becomes softened by the caries, the dental pulp is exposed, irritation gives rise to exudations from the gums or edges of the gums, and there are also the products of the morbid changes.

Under these conditions the human oral cavity becomes a perfect breeding place and also a focus of infection for the whole organism, since it has been proved that most pathogenic bacteria find their way into the body through the oral cavity. How great is the number of pathogenic bacteria in the oral cavities of healthy and unhealthy individuals, and their nature, is shown by the following. In the saliva of 127 healthy individuals who were examined Netter found Fränkel-Weichselbaum's pneumococcus in 80 per cent. of those who had had pneumonia, and in 20 per cent. of those who had never had pneumonia; Friedländer's pneumonia bacillus was found in 4·5 per cent., streptococcus pyogenes in 5 per cent., and staphylococcus pyogenes in almost all the cases.

Biondi found in 50 cases examined that the bacillus salivarius septicus was present in 20; in a case of phlegmonous tonsillitis and in two cases of primary pulmonary erysipelas he found the streptococcus septopyaemicus; in one case of primary pulmonary erysipelas and in two healthy individuals he found micrococcus tetragenus which Koch first

isolated from phthisical sputum; and in one case of angina scarlatinosa he found staphylococcus salivarius pyogenes (which can be clearly distinguished from staphylococcus pyogenes aureus and albus) and local suppuration without general infection.

Kreibohm found in several cases in the fur which coated the human tongue two kinds of bacilli which proved to be highly pathogenic to mice. And Miller in his examination of diseased dental pulp found four kinds which proved highly pathogenic to white mice and less so to guineapigs and rabbits.

G. W. Cook of Chicago gives the following interesting results. In 220 examinations of the mouth he found in 107 cases staphylococcus pyogenes albus 47 times, staphylococcus pyogenes aureus 11 times, streptococcus pyogenes in 68 out of 107 cases, micrococcus tetragenus 11 times in 62 who were examined (and all these 11 suffered from phthisis), micrococcus pneumoniae in 7 out of 92 cases (who were all suffering from catarrhal affections of the lungs); the Krebs-Löffler diphtheria bacillus in 14, and the pseudo-diphtheria bacillus in 21 out of 186 cases; and in 171 of the 220 mouths examined this author found tubercle bacilli.

Vignal found ten kinds of micro-organisms in the faecal masses, five of which he had cultivated from the oral cavity.

These facts might easily be multiplied. Nevertheless they suffice to show even to indifferent optimists the great importance of care of the mouth and teeth.

Before passing on to the description of general prophylaxis a few important points still remain to be mentioned. There is no doubt that most bacteria in the mouth can, in consequence of the very favourable conditions, multiply readily and give rise to injurious effects, and that the statements I made above probably understate the case. On the other hand it must be remembered that a large number of bacteria are very quickly destroyed or removed with the sputum. And although we have no direct proof, yet we may conclude from analogy that the growth of this or of that kind of bacteria renders the

mouth unsuitable as a soil for other kinds, but on the other hand provides suitable soil for other kinds again which may settle there. The saliva too, which after remaining for some time in the mouth acquires an acid reaction, destroys many bacteria, although saliva by itself has no anti-bacterial action. The bacteria are also in part destroyed by their own products, or they use up the nutritive material in carious teeth or decomposed pulp, and thus remove the conditions which would be favourable to the growth of other kinds of bacteria. Others probably get into the stomach and are there destroyed by the hydrochloric acid.

How great is the number of different pathogenic bacteria in the oral cavity (not to mention the non-pathogenic) is shown by the large number of diseases which may be caused not only by local but also by general infection; but this subject cannot be entered into in detail here. It is worthy of note that the healthy epithelium makes infection very difficult, but that an injured mucous membrane, or one whose resisting power is diminished, makes the entry of pathogenic germs easy, though they may not produce any local effect, but affect more distant parts.

The observation that the number of pathogenic bacteria in an uncleansed mouth is much greater than in a cleansed mouth may be taken as a guide for the general prophylaxis of the diseases of the mouth. Cleansing of the mouth is thus a means by which we may considerably reduce the number of bacteria which it contains. The only questions that arise are (1) whether this is possible; (2) whether and how far it is necessary; (3) how it may be done.

Miller's researches show that the first question must be answered in the negative. In spite of the most careful mechanical cleansing and subsequent disinfection of the mouth it could be kept sterile only for a few minutes. First those six kinds of bacteria appeared which Miller terms proper to the mouth, and later other bacteria were found.

The second question is very important. That disinfection of the mouth is necessary is shown by the presence in it of

pathogenic germs. And as it is impossible to keep the mouth sterile for long, the question arises how far this is necessary. One might naturally think that it is an absolute necessity. But such is not the case, and the researches of Duclaux, Pasteur and Schottelius show that nutrition is not efficient without bacteria. Probably however the injurious may and should be destroyed and their development checked. Nature herself sees to it that the micro-organisms which are necessary to nutrition reappear in the mouth.

The question then arises how the cleansing and disinfection of the mouth may be best carried out. The researches of Roese have shown that simple cleansing with water is inefficient in the care of the teeth and mouth. He was only able to reduce the bacterial contents of the water used for washing out the mouth in the experiment (sterile sodium chloride and peptone solution) from 100 per cent. to about 40 per cent. after very long brushing. One must therefore resort to chemical antiseptics, as was first pointed out by Miller. In his work on the micro-organisms of the mouth this careful investigator has given the results of years of work, and these are still valid and have merely been improved upon by other writers. The principal agent in the care of the mouth is the mouthwash.

According to Miller a mouthwash should fulfil the following conditions—(1) It should be non-poisonous; (2) its reaction should be neutral, because acid as well as alkaline mouthwashes affect the teeth; (3) it should not corrode; (4) it should act as a germicide; (5) it should free the mouth from an unpleasant odour and refresh it; (6) it should have a pleasant taste. Experience teaches that a mouthwash will only be used by the public if it fulfils the last two conditions, and much attention should be given to this in prescribing. A mouthwash which has an unpleasant flavour will not be generally used even though its value is supported by the highest authorities. One must also guard against using any of the many substances which are sold for the teeth, and often recommended by the most exaggerated advertisements, unless one is sure of their action. The mouthwashes which can be bought fail

almost without exception in their object, and for this reason alone are much too dear. Many too contain substances which are very bad for the teeth, such as salicylic acid or alum. Others again certainly contain some antiseptic substances but in far too small a quantity, or incapable during the very short time they remain in the mouth of acting efficiently. We have to consider not only the disinfecting power of the mouthwash in general, but also its rapidity of action. Of the substances which can be used for disinfecting the mouth only in a certain strength many must therefore be excluded. The table on the opposite page, drawn up in accordance with Miller's researches and taken from my "Diagnostic and Therapeutic Pocketbook for Dental Surgeons," gives a concise view.

This table shows that very few substances can be used to disinfect the mouth quickly. From among those which sterilize the mouth in a short time we must exclude iodine trichloride and salicylic acid, because they affect the calcareous parts of the teeth. Corrosive sublimate in combination with benzoic acid is very effectual, because the former combines with the superficial layers of the mucous membrane to form an albuminoid compound, which is a very unfavourable soil for bacteria. Miller recommends the addition of corrosive sublimate to the extent of eight parts to the following mouthwash:—

	Parts.
Acidi benzoici	30
Tinc. eucalypti	150
Alcohol	1000
Ol. menthae piperitae	7·5

Enough of this should be added to half a wineglass of water to make it distinctly muddy in appearance. Miller maintains that corrosive sublimate is perfectly harmless, but others advise against its use, and rightly so, because apart from its disagreeable taste, the poisonous properties of corrosive sublimate cannot be lightly estimated.

As disinfectants there remain then only benzoic acid, borobenzoic acid, saccharin, thymol and listerin. Of these Miller has given up thymol because of its very unpleasant

Antiseptic.	Strength in which antiseptic can be used in the mouth.	Time required to sterilize the mouth.
Benzoic acid	1 in 300 to 1 in 200	2–2½ min.
Boric acid	1 in 50	Over 11 „
Borobenzoic acid	1 in 175	1 to 2 „
Carbolic acid	1 in 100	„ 5 „
Eugenol	1 in 750	„ 10 „
Eucalyptus oil	1 in 625	„ 8 „
Hydronaphthol	1 in 1,500	„ 15 „
Iodine trichloride	1 in 2,000 to 1 in 1,500	1¼ „
Potassium chlorate	1 in 40	
„ permanganate	1 in 2,500	
Pine oil	1 in 360	„ 19 „
Solution of aluminum acetate	1 in 20	„ 5 „
Listerin (American preparation consisting of eucalyptus oil, borobenzoic acid and oleum gaultheriae)	—	„ ¼ to ½ „
Lysol	1 in 200	„ 5 „
Oil of cloves	1 in 550	„ 11 „
β-naphthol	1 in 1,500	„ 10 „
Oil of peppermint	1 in 600	„ 11 „
Saccharin	1 in 400	¾ to 1 „
Soluble saccharin (1 part of a saturated alcoholic solution in 10 of water)	1 in 120	„ 5 „
Salicylic acid	1 in 300 to 1 in 200	¾ to 1 „
Perchloride of mercury	1 in 5,000 to 1 in 2,500	2 to ½ „
Thallin sulphate	1 in 1,000	„ 6 „
Thymol	1 in 2,000	„ 5½ „
Hydrogen peroxide	10 in 100	10 to 15 „
Oil of wintergreen	1 in 350	„ 12 „
Oil of cinnamon	1 in 400	„ 8 „
Zinc sulpho carbolate	1 in 250	„ 7½ „
Eau de Botôt	—	„ 15 „
Eau de Pierre	—	„ 11½ „

taste, and saccharin because it is unbearably sweet, and he prescribed the mouthwash given above without thymol, and later replaced the eucalyptus tincture by rhatany tincture. Listerin, which is very useful but has not been introduced among us, is used by putting a few drops on the toothbrush. More recently Roese has also made investigations into mouthwashes, and has added considerably to the work done by Miller, and added a few other newer substances. Roese found that some substances had a

momentary good effect, others a permanent good effect. To the former group belongs formaldehyde; to the latter benzoic acid and "odol"; corrosive sublimate belongs to both.

The following points in Roese's work are worthy of mention. Sublimate is a good disinfectant, but is not suitable for general use.

Miller's benzoic acid mouthwashes are only effectual in ten per cent. fresh solutions.

Ethereal oils are, as Miller and Riedlin have already shown, without effect.

Hydrogen peroxide, which as a three per cent. solution has been put on sale in Berlin as "katharol," is unsuitable for daily use because of its acidity.

Potassium permanganate has after effects but no immediate effects, and moreover produces manganese binoxide, which is so difficult to remove. It is useless as a mouthwash, but very suitable for after treatment in fractured jaw.

Potassium chloride is recommended by Unna for a daily mouthwash, but it is not good. It softens the gums when in constant use, and may sometimes produce toxic effects, especially as it may accumulate in the body.

My former statement that formalin was unsuitable as an addition to mouthwashes, has been proved by Roese to be experimentally correct. Formalin hardens the mucous membrane of the mouth, and thus forms a good soil for bacteria; it corrodes and has an unpleasant taste which cannot be removed. These properties of formalin still persist in the formalin mouthwashes which are sold as "desodor" and "kosmin."

Roese confirms the statements made by Miller about eau de botôt and salicylic acid. Alum too must not be used: mouthwashes which contain these substances and have been recommended must therefore be given up.

Salol too is not suitable as a mouthwash, because when it comes into contact with the living cell it splits up into salicylic acid and phenol. But the case is quite different with odol antisepticum. This is similar to salol, but probably

a salicylalbumin compound which does not injure the teeth and which is, according to Hefelmann, especially bacteriocidal in the nascent state.

As odol is harmless and has no unpleasant taste it may be recommended for use, even though it does not fulfil all the conditions of a good mouthwash.

Roese made experiments also with alcohol, and found that it had the greatest effect in disinfecting the mouth when diluted to sixty per cent. With this strength the alcohol must only be used to paint the gums or be put on the tooth-brush. The mucous membrane of the mouth only tolerates it when diluted to thirty per cent., and the effect of this is no better than five per cent. odol, or ten per cent. solution of Miller's mouthwash, and the effect of the latter may be still further increased by adding physiological saline solution. The latter has, according to Roese, when it is lukewarm a power of checking the development of bacteria, and may be recommended therefore when warm for use by poor patients, and it is certainly to be preferred to Seifert's prescription of one teaspoonful of sodium bicarbonate to half a litre of water to which a piece of camphor is added. Alcohol has other effects besides that of destroying germs. Its property of dissolving fat is not unimportant; but most important is its action upon the circulation, which it increases. Experience has long shown that the metabolism of an organ is increased by improving the circulation of blood through the organ; the metabolic products which have accumulated in the tissues are mechanically taken up by the blood current, carried away and destroyed. That is the reason why alcohol has always been added to tooth-tinctures.

From what has been said it is plain that we have no mouthwash which fulfils all the requisite conditions. Recently attempts have been made to prepare a mouthwash which should consist of alcohol and an antiseptic. Witzel has a liquid alcoholic tooth-soap prepared in Dr. Siebert's chemical manufactory, which is said to combine the advantages of an antiseptic mouthwash and of a mechanical cleansing substance. We shall have to wait in order to

know what are its results. For the present we have to fall back upon a combination of several antiseptics as a mouth-wash.

I have tried and can recommend the following combination which is pleasant to the taste:—

	Parts.
1. Thymol	·2
Acid. borobenzoic	1.5
Saccharin	·05
Tinct. kramer.	5 to 10
Spir. vini rectif.	100
Ol. menth. piperit.	1.5
Ol. anisi	·5

The following preparation has a stronger taste:—

2. Thymol	·2
Acid. borobenzoic	3
Saccharin	·5
Menthol	3
Tinct. kramer.	10
Eau de Cologne	25
Spir. vini rectif.	100
3. Acid. borobenzoic	5
Menthol	5
Tinct. kramer.	15
Eau de Cologne	50
Spir. vini rectif.	100
4. Saturated solution sod. chlorid.	70
Acid. borobenzoic	3
Saccharin	·5
Tinct. kramer.	15
Spir. vini rectif.	100
Ol. menth. piperit.	1
Ol. anisi	·5
5. Saturated solution sod. chlorid.	70
Acid. borobenzoic	3
Saccharin	·2
Tinct. kramer.	15
Eau de Cologne to	100

Of these tinctures thirty to forty-five drops, or if they contain sodium chloride double this quantity, are added to three ounces of water, and it is then ready for use.

All five prescriptions contain a quantity of tincture of rhatany. By its astringent and tonic action the latter maintains the mucous membrane of the mouth in a healthy condition, and as experience shows that we must not place too great reliance upon the bactericidal power of a mouthwash, it affords a prophylaxis which must satisfy us for the present.

The use of the toothbrush is very valuable in helping to keep the gums healthy. The friction produced by it makes the gums firmer and more capable of resistance. The brush should not be too soft and also not too hard. A medium hardness suffices in most cases. Gums which bleed when it is first used soon acquire the normal consistency, and will then no longer bleed when they are brushed, provided of course that all factors which might cause a gingivitis have been removed. The teeth should be cleaned in all directions, the front and back, and the masticating surfaces, and in a horizontal and a vertical direction. The toothbrushes which have been devised for this purpose do not seem to be any more useful than the ordinary straight toothbrushes. The use of the toothbrush several times a day is indispensable and cannot be replaced by the use of an antiseptic mouthwash.

Before using it the teeth, or rather the interstices, should be mechanically cleaned by a soft toothpick of tortoise-shell, wood, or quill, or a waxed silk thread, care being taken not to injure the interdental papillae. A toothbrush and mouthwash should then be used to brush the teeth and gums, and finally the mouth should be rinsed out with the same mouthwash. This should be done in such a way that by the gargling as much as possible of the mouth, wash is brought into contact with the mucous membrane, while another fresh quantity is made to pass in the interstices between the teeth by the action of the buccinator muscle. But when it is desired to let the disinfectant act upon the hinder parts of pharynx, for example as a prophylactic against diseases of the throat, then it is best to use the following lozenges both for children who cannot gargle and also for adults, because the hinder parts of the pharynx generally escape in gargling.

1. Coffeae tostae 75
   Pulv. acid. boris 25
   Saccharin . . . . . ·65
   Tinct. vanillae, mucil. acaciae . . . . . qs.
   Make into lozenges of ten grains each.

2. Sacchar. 200
   Ol. menth. piperit. 1
   Thymol . . . . . ·2
   Alcohol absol. 2
   Succ. limonis et tinct. vanillae . . . . . qs.
   Make into lozenges of ten grains each.

3. Sacchar. alb. 100
   Saccharin . . . . . ·3
   Alcohol absol. . . . . ·2
   Thymol . . . . . ·2
   Ol. menth. piperit. 1
   Fructus citri et tinct. vanillae . . . . . qs.
   Make into lozenges of ten grains each.

The last two prescriptions are recommended by Hartmann during epidemics of diphtheria. Szana mixes a grain of saccharin, and a grain of guaiacum resin with ordinary sugar and has them made up as sweets. As the last three prescriptions contain sugar, this method might be of advantage for children in special cases. I would recommend the use of the first prescription.

The "oriental pastilles" which are sold contain tartaric acid and cannot therefore be recommended. The proper time for cleaning the mouth is after every meal and before going to bed. The latter is very important, because during the night the conditions for fermentation are the most favourable.

It remains for us now to consider tooth soaps and tooth powders.

Tooth soaps consist mainly of soap, and their daily use is not advisable because there is really no neutral soap, and the smaller or greater quantity of alkali contained in all soaps relaxes the mucous membrane of the mouth.

But one need not altogether give up using a little soap with the tooth powder, for experience shows that most people with healthy buccal mucous membrane bear it very well. When the gums bleed easily the addition of soap is

contraindicated. Tooth powder has only a mechanical cleansing value, the chemical or antacid action is but slight. Moreover it has the disadvantage of remaining in cavities, and prevents the mouthwash from acting there. For well-cared-for teeth a tooth powder should be used at most once a week. It should contain no injurious or fermentable substance. Coal ashes, wood ashes, or cigar ashes and toasted bread should not be used to clean the teeth. I recommend the following:—

1.	Calc. carb. praecip.	100
	Magnes. carb.	10
	Sapon.	5
	Ol. menth. piperit.	1
2.	Calc. carb. praecip.	100
	Magnes. carb.	20
	Sapon.	5
	Saccharin	·1
	Ol. menth. piperit.	2
3.	Calc. carb. praecip.	40
	Magnes. carb.	10
	Saccharin	·75
	Acid. benzoic.	1
	Ol. menth. piperit.	1
	Carmin.	·5

A happy medium between tooth powders and tooth soaps is formed by the so called tooth pastes which are of doughy consistence, and contain substances both for cleaning and disinfecting purposes. There should be no honey or fermentable substance in the paste. This is not found in Miller's prescriptions, nor in those given in my "Diagnostic and Therapeutic Pocketbook for Dental Surgeons." My own prescription has been a little altered to the following:—

Calc. carb. praecip.	50
Magnes. carb.	5
Sapon.	15
Pulv. myrrhae	15
Glycerini	20
Spir. armorac.	5
Ol. menth. piperit.	2
Ol. myrrhae	2
Carmin.	·2

In concluding this General Part, I would point out that antisepsis and asepsis must not be omitted even in slight operations in the mouth. One must always remember that the pathogenic germs in the mouth can very easily get into the blood stream through the open blood and lymph vessels. The operation area should be properly disinfected, the hands by Fürbringer's method, and the instruments by formalin vapour, which will probably be found the most convenient.

For the rest, reference should be made in this text-book to the sections on surgical diseases.

II. Special Prophylaxis

Special prophylaxis in diseases of the teeth and mouth has not only to deal with diseases in the proper sense of the word, but also with those physiological symptoms and accompaniments of dentition which one cannot look upon as morbid, but only as pathological, and not influencing the general health.

I. DENTITION

We have long been accustomed to speak of the teeth of the first dentition as "milk teeth," and of those of the second dentition as "permanent teeth." Although this division cannot be justified, because the permanent molars in their development belong to the first set of teeth, and are analogous also to the milk teeth, yet in what follows the old division will be retained.

The normal commencement of eruption of the milk teeth is the seventh or eighth month, but it may be later even in well nourished and well developed children.

In order to minimize the unpleasant symptoms often associated with the eruption of the teeth in children, a careful diet and attention to the skin are required. Experience has shown that breast-fed children cut their teeth most easily. The mouth needs to be kept very clean during dentition. To wash it out one should use wool or gauze, or a camel's hair brush which is kept constantly in

a disinfectant (such as a solution of boric acid and thymol). The constant wiping out with pieces of old linen wrapped round the finger is inadmissible.

Any abnormal symptoms, gastric and intestinal disturbances and nervous symptoms, should always be carefully watched, because they do not always arise in connection with dentition. The saliva which often flows in large quantities should be constantly wiped away to prevent the adjacent parts of the skin from becoming sore. The irritation of the gums is often relieved by biting rings and similar objects of bone; all applications such as honey, or butter, which tend to soften the tissues, are to be forbidden.

The gums should certainly not be lanced. This proceeding which Graser still recommends in rare cases, advising that an oval piece be cut out, is not only useless but even dangerous. The more recent researches of Robin show that the dental sac forms a protecting covering for the tooth until it is completely cut. If the dental sac is cut open, and this is necessary in order to make a free passage for the tooth, then in most cases there arises a severe infective inflammation which cannot but be bad for the germ of the permanent tooth, and causes the child greater pain than it would otherwise have had. Robin was able to prove this experimentally in dogs. Moreover the wound and the pain prevent the child from sucking properly, and its nutrition suffers. For pain in the gum we may order it to be painted with eucain.

1.	Eucain hydrochlor.	·1
	Syrup. simplic.	10
	Tinct. croci	gtt. x.
2.	Eucain hydrochlor.	·1
	Sod. chloridi	1
	Glycerin	10
	Aqu. dest.	10

For very severe inflammation Muskett paints the gums several times with the following:—

Zinc. chlorid	·6
Aq. dest.	30

For the prevention of general diseases and nervous affections in teething children, see the section on the Prophylaxis of Diseases in children. In this place we have to consider local symptoms only. But a question which is often put to the physician or dentist is, whether the milk teeth require any care, or when should it commence. All the injurious influences mentioned in the general part may affect the child's mouth as much as the adult's, and care of the teeth is therefore just as necessary. It has already been said that the mouth should be cleaned with a camel's hair brush. One can commence to teach the care of the mouth from the third year onwards; children of six or seven years should be able to clean their teeth and mouth.

Carious milk teeth should be stopped in order to prevent other complications, such as stomatitis, inflammation of the pulp and abscess.

The eruption of the permanent teeth is much easier than that of the milk teeth. That the cutting of the permanent teeth may be regular, care must be taken that the milk teeth are not destroyed before their time, because inflammation and abscesses of these may injure the germ of the permanent teeth, and because by early extraction abnormalities in position may arise. When a milk tooth is removed and the permanent tooth does not quickly fill up the gap, this becomes smaller by the approximation of the neighbouring teeth, and the permanent tooth which subsequently appears must take an inclined position, i.e. forwards or backwards relatively to the alveolar arch. On the other hand the milk teeth or their remnants must not remain too long in the mouth, but be removed in time to prevent similar ill effects. The milk teeth require therefore good and constant supervision and treatment by a dentist just as do the permanent teeth, and we should not allow them to take their own course because they will be replaced by others.

Much trouble is sometimes caused by the eruption of the lower wisdom teeth. In many cases we can prevent this

by endeavouring to remove the main cause of the trouble, namely want of space.

There are according to Sternfeld three methods which may be employed: (1) Grinding away of part of a tooth. (2) Expansion. (3) Extraction.

The first two methods are only used in special cases which cannot be further described here; the third is an extremely important and trustworthy prophylactic measure for ensuring the unobstructed eruption of the wisdom tooth, and in a wider sense for the good order of the entire set of teeth. The only question is which tooth is to be extracted. The first permanent molar is the weakest tooth and most likely to decay early, and we should therefore think of this tooth when the teeth are too crowded, and extraction is necessary both for the sake of the front teeth as well as of the molars. In some cases one would sacrifice a bicuspid on each side when these are very carious while the first molars are in good condition. In very rare cases we may proceed to extract the second molars. While formerly I took the view that we should in almost all cases endeavour to keep the first molars, I now agree with Sternfeld. There is only the question which is the best time for the extraction of the first molars. Sternfeld gives the period from eleven and half to the thirteenth year, that is before the eruption of the second molars, and that corresponds fairly with the date I recommend, namely, before the complete eruption of the second molars and after the appearance of the first bicuspids. The difference between the two periods, the eleventh to fourteenth, and tenth to thirteenth years, amounts practically to one year. Till this time then the first molar should be kept. But if the proper time for the extraction is past, or if it was unnecessary to make an extraction at that time, there remains often no choice between sacrificing the third molar itself, or the second molar, because thus only can further harm be prevented. It is obvious that we are speaking now only of severe cases; for less severe cases symptomatic treatment is appropriate.

II. Abnormalities

I have already said that by proper care of the milk teeth we can in many cases prevent anomalies in position of the permanent teeth. Too early or too late extraction of the milk teeth must be avoided. We must try to preserve the lower incisor teeth, the upper canines, and the second molars of the milk set, until the permanent teeth appear.

Special mention must be made of the treatment to be adopted in cases where the milk teeth are still firmly fixed, that is, the fangs are still unabsorbed. Here we have to consider in each case whether the place is to be kept open by letting the tooth remain, or not. Extraction is often indicated, and often too expansion. But as the latter method does not always give the desired result, extraction is indicated for primary lack of space. The same principles apply here as were given in the treatment of difficult eruption of the wisdom teeth. The first molar is still to be regarded as the best for extraction. But we must urgently warn against the mistake of drawing the first molar and then for the sake of "symmetry" proceeding at once to the extraction of two, or even of all four first molars, as has been recommended by several dentists, by Jessen among others, and recently by W. Mitchell of London, "even though they could be perfectly well stopped."

By the extraction of one tooth the children are often saved from tedious procedures, because self regulation often sets in. We must warn however against any unnecessary extraction after all the teeth have appeared. Modern dentistry has advanced so far that it is now possible to save very many teeth which formerly would have been extracted by forceps. By keeping the teeth we prevent many changes in position and their consequences, such as loosening and subsequently falling out, which are caused by removing those opposed to them. This is not the place in which to describe in detail all the prophylactic measures which are possible to prevent anomalies of position, we can only mention the most important, and shall therefore give the

prophylaxis of a few of the most important abnormalities of the alveolar arch. It is obvious that prophylaxis is possible only in the case of secondary anomalies.

The most important is prognathism. The chief cause of this anomaly is the defective development or early loss of the first permanent molars, and it is therefore clear how very important it is to preserve the first molars, at least temporarily.

If these are early lost, the other teeth, namely the upper incisor teeth, have to make good this loss; they must bear the entire force of the masticating muscles and yield in the forward direction. In the same way, primary, so-called physiological prognathism may be made worse. In both cases the result may be disturbances in speech and in mastication which might very easily be prevented by at least temporary preservation of the first molars. Among the remaining forms of pathological prognathism, prophylaxis is, according to Sternfeld, possible only in that form which is the accompaniment of so-called contracted jaw. A contracted jaw is said to be caused by constantly keeping the mouth open, as a consequence of adenoid vegetations in the naso-pharynx or enlarged tonsils, and might be prevented by early removal of the growth or of the tonsils.

But according to Danziger, the cause is in very many cases different; for the contracted jaw is a result of primary mal-development of the skull, in which the adjoining bony parts of the nose are also cramped, so that the patients are obliged to breathe through the mouth, and this may give rise to pathological prognathism which cannot be prevented. Sometimes prognathism may be caused by sucking the thumb or lips, or by the pressure of the tongue. If these bad habits are seen in children, they should be checked.

I doubt very much whether it is possible to prevent true so-called " open bite" where the last molar teeth alone meet. According to the few observations I have been able to make, adenoid growths and hypertrophy of the tonsils are not the cause of this. Where such cases have been described in medical literature, they have been confused with the

forms of contracted jaws mentioned above. We must also briefly mention defects in the teeth. The so-called wedge-shaped teeth are, it is almost certain, not produced by brushing vertically with the toothbrush, as is still often assumed to be the case; the nature of these is still obscure, and nothing can therefore be done by way of prophylaxis. Repeated touching with nitrate of silver relieves the pain which often occurs in these cases. We are also powerless to prevent so-called rhachitic teeth, falsely called Hutchinson's teeth. While we continue to be ignorant of the influence which the dyscrasias, such as rickets, exercise upon the teeth, we cannot speak of any prophylaxis of the enamelhypoplasia, for such it is. We only know that nutritional changes during the period of their development must be the cause.

This knowledge presses upon us the question whether anything can be done to promote the regular development and normal eruption of the milk and permanent teeth. I discussed this subject in an address in Kiel, in 1899, and will briefly refer to it here.

The whole question is whether we possess means by which the development of the teeth may be assisted. An exact answer cannot at present be given, as hardly two authorities have obtained the same results in their researches. Although according to Miller it may sometimes happen that bad development of the teeth is caused by deficient lime in the food, yet in most cases it is caused by imperfect absorption or assimilation of lime salts, which are contained in a sufficient quantity to build up bones and teeth even in the poorest diet. If deficient lime salts and phosphates were the cause of the defective development of the teeth, the mischief could be removed by the administration of lime salts, but such attempts have hitherto done no good. It is much more probable that the function of the organs of assimilation, of the odontoblasts and ameloblasts is imperfect. But when the formative cells are incapable of normal assimilation the administration of inorganic salts for the better development of the teeth is useless, and has been tried, naturally without success. Doses

of phosphorus, $\frac{1}{130}$ to $\frac{1}{75}$ grain, are probably also useless, since Mira and Streltzner have proved by experiments on animals, that treatment with phosphorus never causes the deposit of lime in tissues which are deficient in lime, and probably therefore not in teeth badly formed from defective action of the formative cells. Beraz earlier came to the same conclusion in his researches into the "value of lime for the teeth." In more recent times Dr. Deninger of Mayence has recommended that calcium fluoride, in doses of $1\frac{1}{2}$ grains in the day, be given to the mother before the birth of the child. But we now know that lime salts cannot thus be withdrawn from the maternal body in favour of the foetus, and therefore we cannot thus influence either the development of the teeth or the structure of those already formed. The latter is impossible also for the reason that what has already been organized in the teeth cannot be altered. We must not omit to mention researches, especially by Röse, to discover whether the amount of lime contained in the soil, and therefore in the drinking water, has any influence upon the resisting power of the teeth. Röse thought that he had proved the influence by statistics, but other authorities, myself among them, have obtained very different results, and new investigations are needed to settle this question.

Although the prospects of improving the development of the teeth by external measures are as yet very poor, certain points must nevertheless not be neglected. As it is known that heredity plays a large rôle in development, and that the way of living and nature of the food exercise an undoubted influence upon the animal organism, we are able to suggest the following prophylactic measures. First of all, we must ensure hygienic conditions of life, fresh air and proper food. Effeminacy, which has undoubtedly appeared among the richer classes, must be combated. During the dentition period there is no real substitute for milk. Later, food containing sufficient lime should be given, the carbohydrates restricted in amount, and the food thoroughly well masticated. The act of mastication compels the muscles to work better, and this causes a better circulation

of blood to the parts around the teeth, and thereby an increased deposit of lime salts and a normal eruption of the teeth. This has been proved experimentally in dogs by Robin. It may also safely be assumed that, to quote Walkhoff's words, "the inheritance of an active formative material" also plays a part.

III. Diseases of the Teeth and Gums

The few preventive measures which have been recommended to ensure a better development of the teeth will be also, in the wider sense, prophylactic against disease of the teeth, such as dental caries. The greater the power of resistance of the teeth, the less will they be affected by caries.

I do not for a moment mean to imply that dental caries can be most effectually prevented by the measures described in the previous chapter, because caries begins most easily at those places which the microscope shows to be least well developed, and this may be the result of nutritional disturbances of the whole body during the developmental period of the teeth.

On the other hand we are in a position to deal with the direct predisposing causes, which are external conformation and position of the teeth, and abnormal fermentative processes, as well as the exciting causes, namely acids and micro-organisms. According to Miller prophylaxis may proceed along three different lines: (1) operative interference; (2) measures to ensure a good development of the teeth; (3) care of the teeth.

Operative procedures consist first in treating retention, removing irregular carious teeth, that is those which stand out beyond the alveolar border, grinding away projecting edges of old stoppings, regulation of the teeth and treatment of all carious spots. All these are matters about which only a dentist can decide. In regulating the teeth, a very tedious matter, care must be taken that the result is adequate to the trouble taken. Often the extraction

of one tooth will be of more value, but one must guard against unnecessarily sacrificing a sound tooth. The six-year molar has already been mentioned in this connection.

The carious places must be made harmless by the application of nitrate of silver or by stopping.

Nitrate of silver may only be used for flat cavities and in milk teeth. In other cases stopping is the best preventive measure for caries. An artificial stopping is often ideal for healthy strong teeth. But every one does not understand how to put in a good stopping. Above all the patient must beware of getting into the hands of a quack, for very often mistakes cannot be made good. Moreover no one kind of material is suitable in all cases. The choice must be left to the dentist. In order to prevent caries from becoming very extensive the teeth should be examined by a dentist every six months and treated so as to prevent further complications.

The measures to ensure a good development of the teeth have already been mentioned. The rules given in the general section about the care of the mouth for the removal of acids, abnormal fermentative conditions and micro-organisms, are applicable here also. In order to prevent disease of the pulp and periodonteum the measures recommended above suffice in general because these are caused in most cases by far-advanced caries, idiopathic disease of the pulp and periodonteum being comparatively rare. When once the pulp of a tooth is diseased simple stopping will not do. In spite of all advertisements in which the curative power of substances which contain formalin is specially praised, it cannot be too strongly maintained that the permanent preservation of a tooth with diseased pulp can only be secured by destroying the pulp with arsenious acid and a subsequent stopping of the fang. This is also true of teeth the pulp of which is already purulent or gangrenous or has given rise to a dental fistula. Such teeth do not require to be extracted but can be saved. Much certainly depends upon the skill and scientific training of the dentist entrusted with the case. Diseases of the periodonteum and their sequelae,

such as fistula, abscess, necrosis of the alveolar border, empyema of the Antrum of Highmore, pyaemia and septicaemia, are best prevented by extraction of the tooth and care of the mouth.

Here we must also mention pyorrhoea alveolaris. As we are in complete ignorance of the cause of this disease nothing can be done to prevent it. But by appropriate therapeutic treatment we may attempt to check its further progress.

Partsch considers that only those cases of disease can be regarded as genuine pyorrhoea alveolaris "in which with healthy—I would add apparently healthy—gums pus exudes from the alveoli, although there are no deposits of tartar or other apparent cause for the suppuration." I can recommend the following as a fairly effectual treatment: the alveoli must be cauterized with the thermocautery under cocaine anaesthesia, opened up and treated with an alcoholic solution of corrosive sublimate. If a repetition of these measures seems indicated, the cavities should be plugged with iodoform gauze. As a prophylactic mouthwash I have successfully used a solution of hydrogen peroxide diluted for use with two-thirds of water. In many cases treatment is quite useless. Sometimes I have seen a decided improvement after the use of Karlsbad or Marienbad water, from which one may assume that the cause of pyorrhoea alveolaris is often to be found in some constitutional anomaly.

The diseases of the gum and their sequelae may also in general be prevented by care of the mouth and teeth, and there is no need therefore to say more about them here.

PROPHYLAXIS IN THE EXTRACTION OF TEETH

The country practitioner, who cannot always send his patients to a dentist, has often to perform extractions.

Much experience is needed for the skilful extraction of teeth, and as I know from experience how many mishaps may occur to one who has little practice, a few practical remarks will probably not be out of place here.

The young doctor who is going to practise in the country should be urgently advised first to attend a dental hospital, and secondly in selecting his instruments to be careful to get good tooth forceps, because those sold by many dealers to young doctors are sometimes of old pattern and not very serviceable.

Probably the commonest mishap is a fracture of the crown of the tooth. This cannot always be avoided, yet it is advisable with very carious teeth not to place too great reliance upon the grip of the crown, and rather to make use of the stump forceps at once than when too late.

Injury to neighbouring teeth is generally due to want of skill in the operator. It can only be prevented by great care. Very rarely the roots of the second milk-molar grasp the crown of the permanent second bicuspid, and this is drawn when the former is being extracted. This is unavoidable as we cannot see into the bone.

Secondly the jaw may be injured. Fracture of the jaw is hardly possible if the operation is at all skilfully done. However it is occasionally met with. To prevent it one should be sure not to use the "key" which unfortunately is still used in most German military hospitals.

Fractures of the alveolar margin are very often caused by taking too wide a hold of the alveolar border with forceps which do not bite. This misfortune and further complications can only be prevented by using proper instruments.

Thirdly injury of the adjacent soft parts is possible. Small tears and bruises are often unavoidable in difficult extractions and do not much matter. In order to prevent large tears when the teeth are very carious, brittle or have very deep roots, and the whole root must be firmly held to ensure a successful extraction, the gum must be previously incised with a scalpel or a fine stump forceps must be passed deeply beneath the gum. The removal of the alveolus with the gum cannot be called good, but is better than breaking the bone without any final result. For the lower molars, where the anatomical conformation of the lower jaw does not permit of the forceps being

passed so deeply towards the root, one is obliged to resort to leverage. The unskilful use of the elevator may cause serious injuries of the cheeks, lips and tongue, as well as dislocation of the jaw. One should never forget to have the instrument entirely in the hand, the thumb being held close to the end so that when the instrument slips up the thumb may receive the blow while the other hand makes counter-pressure on the jaw.

Fourthly a few complications must be mentioned. These are suppuration and pyaemia, also the disappearance of the extracted tooth or of a tooth plate down the pharynx. After even a trivial tooth operation one has seen not only suppuration but also not seldom pyaemia and septicaemia with a fatal result, and therefore antisepsis and asepsis must be strictly carried out in all dental operations. Although antiseptic after-treatment may not be necessary for the smaller operations, it is an urgent necessity for larger operations.

The slipping of a tooth into the pharynx ought never to occur. If one cannot be quite sure of being able to avoid this when the patient is under an anaesthetic and there is very much blood and saliva, the isthmus of the fauces should be protected by a piece of gauze. Artificial teeth should be removed before giving an anaesthetic. Cases of neglect of these precautions are often reported, and reference is therefore made here to the danger of this neglect.

IV. Diseases of the Mouth and Jaws

In order to prevent diseases of the mouth and jaws it is very essential to keep the mouth and teeth healthy by proper care, according to the rules given in the general part and in the foregoing chapters of the special part. Special precautionary measures are available for certain diseases.

Alveolar abscess is most easily prevented by keeping the teeth sound; further complications are prevented by extracting the offending tooth, or by antiseptic treatment of it.

The same may be said about the prophylaxis of dental fistulae. Fistulae of the cheek generally result from gross neglect, and frequently from concealed septic stumps, which should be at once removed.

Necrosis may in many cases be prevented by careful after-treatment when an accident has occurred, such as a bad extraction, a blow or a fall, or if there is inflammation and septic absorption. Phosphorus necrosis may be prevented by great care of the mouth and the stopping of all carious teeth.

To prevent the falling in of the soft parts after extensive necrosis, dental plates should be used.

For the prophylaxis of noma, see the section on children's diseases—also for thrush and aphthous stomatitis.

The prophylaxis of mercurial stomatitis, which may affect workmen who employ mercury and syphilitic patients who take mercury, is as follows:—

Before the commencement of mercurial treatment the patient's gums and buccal mucous membrane should be hardened by the use of astringent mouthwashes. The teeth should be stopped, points and sharp edges ground down and the tartar removed, to prevent lesions of the mucous membrane. If there are already lesions, they should be healed by touching with hydrobromic acid, nitrate of silver, or a five to ten per cent. solution of chromic acid, so that ulceration may be prevented. Professor Jadassohn found that washing out with a two to five per cent. hydrogen peroxide was a preventive. Moreover he first touches the ulcerating surfaces with a ten per cent. solution of chromic acid and directly afterwards with nitrate of silver, by which red silver chromate is formed.

The method is said to be but slightly painful and the ulcers quickly heal.

Prophylactic care of the mouth is still far too little heeded in hospitals, and it were much to be desired that a dentist should be appointed to hospitals. During treatment, care of the mouth and teeth is urgently needed. A two or three per cent. solution of potassium chlorate is the best mouth-wash and is to be preferred to potassium permanganate,

salicyl, or corrosive sublimate. If the gum is already loosened, an attempt must be made by touching the parts with the substances above mentioned. If these fail, we may try dabbing with a solution of methylene blue followed by copious rinsing with water.

Lastly reference must be made to the prophylactic value of plates for covering loss of substance after injuries and after removal of parts.

They are chiefly to replace the lower jaw, and thus to prevent the serious dangers which may follow extensive resection. The deformity and the interference with mastication, swallowing and speech, can in very few cases indeed be prevented by operation, but require the help of the dentist.

To the question, When is the plate to be used, at once or after healing? one must reply that it should be used immediately.

If we wait till healing has taken place, it then requires a tedious stretching of the scar tissue and replacement of the parts concerned before the plate can be applied, but immediate interposition not only prevents contraction of the soft parts which have been deprived of their support, but does not essentially hinder, except at first, mastication, speech and swallowing.

A trial plate should first be made. To do this an impression is taken before the resection of the jaw, from this model a piece is cut out similar to the piece to be resected, and the piece to be inserted is made according to this. This must be so arranged that it allows of a perfect view of the condition of the wound and does not cover the wound surface. Metal (gold, platinum, or steel covered with tin) must be used for the material, and this plate, the "primary jaw splint," must be constructed of wire to prevent retention of secretion. The object of this splint is to keep the rest of the jaw in its normal position while the wound is healing. It is fastened with screws to the bones, so that with the necessary disinfection there is no hindrance to healing. It must be worn during the whole time that the scar is forming, and it has the further advan-

tage of giving a firm hold for the iodoform gauze plug. As soon the condition of the wound allows it, a permanent plate is made consisting mainly of hard caoutchouc.

The precautions mentioned here are also in a sense applicable for plates after other operations.

The making of artificial noses and of other parts of the face to improve the appearance after loss of the part, and also of obturators for the palate and support for a nose which has fallen in, is also sometimes included in the work of the dentist.

The Prevention of the Diseases of the Throat and Nose

BY

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The Prevention of the Diseases of the Throat and Nose

I. General Prophylaxis

If we would rationally prevent disease of the organ of voice and of speech, we must restrict the demands made upon this organ in its various physiological functions to the range within which the study of its hygiene shows it to be capable of working. This hygiene is applied physiology, and its special use will depend upon a medical knowledge of the individual strength and predisposition. When its professional use enters into the question, we have also to consider the kind and amount of technical training required for the work which is to be done.

Further our experience of certain diseases, both constitutional and local, shows that they have a predilection to attack this part. To cure or prevent the general or primary trouble means often the prevention of the secondary disease. Where this is not possible or is no longer possible, our efforts to prevent disease must naturally be restricted to protecting the organ against the disease with which it is threatened.

The following plan of dealing with the subject naturally suggests itself. First, we have to consider the physiological functions of the naso-pharynx and larynx and the end organs of sense found in them, so far as it is possible to treat any limitations of their functions and thus prevent permanent injury. Next, we shall consider the most important constitutional and local diseases of neighbouring parts in their relation to these functions, such as syphilis, tuberculosis,

lupus, leprosy and diphtheria. Among diseases of neighbouring organs we must consider diseases of the organ of hearing, of the eyes, of the teeth, and of the accessory nasal cavities. Lastly we shall have to consider the interrelation of diseases affecting these regions—the extension of disease of the larynx to the throat and nose, and conversely the results to the accessory nasal cavities which may follow the existence of disease of the nose and throat.

Accordingly the first group of preventive measures to be discussed would essentially be those directed against conditions and processes which check functional activity.

To commence with the nasal cavity itself, a prophylaxis against the functional limitations would have to be regarded from three aspects corresponding with the three chief functions of this part—respiration, speech and smell.

We cannot however group these together for consideration because they neither rest upon the same basis clinically, nor are they equally significant in the hygiene of the individual. In this connection we need only point out how serious would be the result of the loss, complete or partial, of the sense of smell in a cook. On the other hand, a slight alteration in the voice of a cook might be scarcely noticed by him, though a similar change in the voice of a singer or a tragedian might make him completely unfit for his profession. Considered from this aspect, prophylactic measures would not be the same; the significance would be different for each individual, and individual treatment would be required.

PROPHYLAXIS FOR LIMITATIONS IN THE POWER OF BREATHING AND SMELL.

The limitations of breathing are put first because of their clinical importance and frequency. It is well known that every one of the common structural changes in the wall of the nose does not necessarily imply an obstruction to respiration any more than does every congestion of the mucous membrane of the turbinate bone. The functional diagnosis that such changes are present should first be made before we attempt to treat locally a region which is so

varied in its structure. It is not within the scope of a work on prophylaxis to enter into further details about this. On the other hand, we must not evade what clinical observation and pathology in common teach. Thus we find there are two main causes of obstruction to respiration in adults, with their sequelae, which result from diminution of the capacity to remove dust from the air, to make it moist and to warm it before it passes to the lungs. One of these two causes is venous obstruction. Mechanical obstructions of various kinds permanently hinder the efficient removal of venous blood from the plexuses in the mucous membrane and submucous layers. If these obstructions cannot be removed as in diseases of the organs of circulation, of the kidneys and liver, prophylactic measures must be restricted to an endeavour to aid and maintain the natural conpensation which the history of the clinical course of these diseases shows to be possible. But if they are curable, then prophylaxis is as it were the ideal treatment. The perception of this connection is the duty of the physician and guards him against the routine local "treatment" of the routine doctor. Every one who has to treat a large number of patients belonging to the richer classes, will bear me out when I say that their unhygienic life finds its most frequent expression in chronic constipation. One cannot in every case lay the blame on the luxurious social life of these classes; in some cases, although a minority, it is the result of too severe or prolonged mental activity and neglect of the body and of muscular activity, in a word, a sedentary life.

In all these cases, besides many other symptoms of obstruction, we find chronic "relaxation" of the mucous membrane over the turbinate bones; the degree of obstruction to nasal respiration associated with it depends upon the amount of the mechanical obstruction in the respiratory nasal passage. Thus a comparatively slight swelling of the part near the middle turbinate bone may give rise to far greater trouble than a greater affection of the lower nasal canal, which does not interfere with the respiratory passage. In addition to this mechanical obstruction, which is met

with in the more permanent conditions, two other factors must be taken into account.

First, the length of time it has taken to develop. Here, as elsewhere, the narrowing of a passage which occurs gradually is better borne than that which sets in more suddenly and develops rapidly. Next, we have to take into account the kind of swelling which affects the mucous membrane; that is to say, in addition to the amount of the mechanical obstruction, we have to consider what is the cause of it, whether some circulatory disturbance or general nervous exhaustion is the cause of the abnormal swollen condition which gives rise to the obstruction. Thus, the sudden appearance of constriction and occlusion in a case where the respiration was previously free, may lead to a diagnosis when the local examination is negative. In other cases we find a mixed transitional state, where some sudden obstruction is engrafted by chance upon some permanent condition which has already impeded respiration.

In other cases there is no mechanical obstruction of the respiratory passage due to venous obstruction which has become permanent, but there is a characteristic abnormal predisposition to disease, to acute rhinitis. Repeated slight attacks, with occasional more severe attacks of inflammation follow one another at intervals, which become shorter and shorter, till finally the least draught or the most trivial wetting or chill of the skin of some remote part of the body, suffices to produce the disease, or to aggravate a subacute or chronic inflammatory condition. In such patients this condition arises, though there is no impeded circulation. The chronic changes which are found are rather the remnants of inflammatory processes which have never perfectly subsided. In children, the inadequacy of nasal respiration is in the majority of cases of very different origin from that in adults. Although an unhygienic life and improper food are the cause of a certain number of cases in childhood, yet these are comparatively few compared with the large number of cases where there is chronic disease of the pharyngeal adenoid tissue, which has been left after acute infectious

diseases in youth. Measles, scarlet fever, and diphtheria are the chief causes. But even in the small minority of cases where the cause of the disease corresponds largely with the cause of it in adults, there is nevertheless this important difference, that in addition to, and probably because of the changes in the mucous lining itself, a mass of adenoid growths appears.

If now, having regard to what has just been said, we attempt to sketch out the prophylactic measures that are available, these will fall under two categories. Of these two categories, the one comprises social and individual hygienic measures, the other comprises those which the physician himself must carry out. For the former, he relies upon the goodwill sometimes of the patient, sometimes of the heads of a business firm, or other authority. Thus in factories and in schools, those who are at the head of these establishments are the authorities in all that refers to trade hygiene, and to most questions of school hygiene. But, as we shall soon see, it does not do to leave prophylactic measures to the well-meant advice of the physician in the consulting room alone. The work is only half done and the treatment inefficient if I try to cure a child which is suffering from recurrent tracheal catarrh, by local treatment and drugs, and then find out by chance that he is next a child at school who has whooping cough. It is just as useless and incorrect to treat the local changes in the nasal cavity of one who works with plaster of paris, or of a clothworker, when there are no protective screens and safeguards in the workshop, to make the work of filtration of the air easier for the upper respiratory passages. While we gratefully acknowledge that in the factory and school there is the commencement of a promising movement which may eventually lead to the dissemination of the most important hygienic rules, yet we know on the other hand how great is the neglect of hygiene in offices and workrooms where there is no supervision, and in private schools where there is far too little supervision. An over-heated dry atmosphere, defective ventilation, uncomfortable postures in sitting

and in writing, unhealthy or badly adapted illumination, are a danger to the upper respiratory passage and to the eyes, just as the continual din of very noisy typewriters, placed side by side, threaten the organ of hearing and the whole nervous system. I have seen badly adapted miserably small rooms in which there were six to eight of these machines. The noise of the typewriters, the heated and bad air, and the dust, made the whole look very similar to the condition of factories before the introduction of the first hygienic regulations for trades. The worst and smallest rooms of a private house are not seldom fitted up for such purposes, and there is at present no supervision whatever of these work places. Only ten years ago I saw in Berlin a school which was recommended by the director of a public school, because his own classes were too full. It was situated in a tenement house of the worst kind in Berlin. The "classes" were held, some in the kitchen, others in the musty bedroom of the schoolmaster. The least said about the school benches the better. Most of the boys sat upon ordinary chairs at a high round dining table, which in the daytime was lighted by an oil lamp, while the rest lay in mystical obscurity.

In every case the physician must not forget to enquire into the particular arrangements for hygiene in the occupations of adults, and of the school in the case of school children, to determine how far these have contributed to cause or keep up any local changes in the upper air passages. In this way alone can the prophylactic measures be placed upon a sure footing, and the carrying out of them will be incumbent on the physician, some of them being already included in the domain of treatment. These measures can obviously not be represented merely by local treatment. On the contrary, in regard to what has been said above, the conscientious physician will often have to refuse to give local treatment. He will even sometimes have to undeceive and surprise patients who see him making other examinations and asking other questions than they had expected. This is often my experience when, after making a rhinoscopic examination of the apparently diseased nose, I

do not proceed to cauterize or to paint it, but examine the chest and digestive organs. With the threatened specialization of medical work and treatment, we have long had even among the better educated a mechanical conception of independent organic diseases, and corresponding specialistic treatment of organs. This is well shown by the naïve astonishment of those patients at the thought that their haemorrhoids or constipation have any relation to their nasal or laryngeal trouble. Sooner than believe this, they fall back upon the favourite idea that a cold is the cause, although there is not the least logical reason for it.

It is very difficult to conceive why these people are content half their lives to ascribe to a cold the causation of their disease, attributing each of their numerous attacks to some trivial exciting cause, instead of really finding out what is the reason for this predisposition to cold. Generally the whole disease is caused by a very unhygienic or irrational way of life; it rests upon physical effeminacy and neglect of the skin. Instead of a sensible hardening of the body, there is anxiety to avoid every breath of air; instead of muscular exercise and action on the skin suitable to the individual, we find coddling, "rest," and improper or excessive food, and a sedentary mode of life. Prophylaxis must prevent the development of such morbid congestions and this condition of excessive irritability, for that process which is often regarded as dependent upon infection will find no entry through healthy resistant skin and mucous membrane.

Then the work of medical prophylaxis is essentially dietetic and gymnastic in the widest sense of these words. Not the routine prescribing of purgative and massage, but a carefully selected and conscientiously supervised personal treatment and care can really be regarded as a preventive of the local disease, and it may make local treatment quite unnecessary, or if the latter be indispensable will render it successful. The duty of the physician as regards prophylaxis is somewhat different when treating children and youths. Here obviously dietetic and gymnastic treatment is

just as useful as in adults, when the processes and conditions are similar. But in the convalescent stage in children special attention should be directed to the upper air passages and their vicinity. Just as disease of the adenoid tissue appears prior to or during the early stage of convalescence, so also do we find that suppuration of neighbouring bony cavities develops at this period. Not seldom they escape the notice of the physician who is treating the case. And yet the irritating effect of the secretions met with in these diseases may prevent the mucous membrane from being restored to its normal condition although there is no stagnation. Slight reflection will show how important it is in these little patients to recognize the presence of such disease as soon as possible. In a large number of these cases the suppurative processes heal without any surgical interference. Recovery can be best promoted by providing a free passage for the pus, and by removing any masses of secretion or swelling which are obstructing the flow. When it has not been possible to prevent this by prophylactic treatment, and there is chronic suppuration in the accessory cavities, then early recognition and cure of the condition will prevent further trouble. Threatened meningitis, the most serious result of the extension and spread of persisting disease of the accessory cavities, may be best and most surely prevented by treating the disease from the very commencement, and thus preventing any ill effects.

When disease of the pharyngeal adenoid tissue has developed after acute infectious diseases, local surgical treatment is required in a very large number of cases. When there is much nasal obstruction one hardly feels inclined to wait and see what will be the result wrought by weeks and months of general tonic treatment—and the usual course is to remove the adenoids by local treatment as a preliminary stage to general dietetic measures and respiratory exercises. But these respiratory exercises must not be neglected, neither should it be forgotten that in many cases the interference with respiration is very slight and not constant. In these cases, if the child is anaemic, weakly

and also very young, general treatment should first be adopted. If local interference is postponed in these cases, we often find that general tonic, dietetic and gymnastic treatment suffices to cure the local trouble. Such treatment belongs therefore also to prophylaxis. The fact that there are adenoids does not necessarily imply that their removal is indicated, but in each individual case we must consider carefully whether operative interference is really necessary. Treatment should not—as is so apt to be the case in special hospitals—be restricted to removal of the adenoids; still less should the aim be to remove every particle of tissue as is sometimes recommended and in vain attempted. Some technical detail in the operation is sometimes relied upon as certain to prevent recurrence, but we would therefore, on the contrary, point out the great importance and value of general treatment. This offers, in my opinion, the surest method of preventing fresh disease. For many years I have recommended for after treatment, systematic respiratory exercises, with and without apparatus, in addition to general tonic and dietetic measures. Among apparatus, I find Hildburghauser's "rowing machine" very serviceable.

PROPHYLAXIS FOR IMPAIRMENT OF VOICE.

We are often asked for medical prophylaxis in this connection by patients whose calling necessitates much use of the voice. The impairment generally felt by the patient is a difficulty in nasal resonance; the voice does not sound as before, it does not carry so far. This must not be confused with that other equally common complaint that a feeling of tiredness, mostly laryngeal, is soon felt; although we sometimes find that the impairment which has been mentioned leads to special efforts to phonate and finally to shouting, which may produce exhaustion of the apparatus for phonation.

And here we may at once say that in our schools far too little is still done to instruct pupils in the art of speaking.

He who draws comparisons between Germany and other countries will see how far ahead of us most of our neighbours are, not only in the art of speaking extempore, but also, if I may so term it, in the essential technics of speech. Many of our young people have never even got over the simplest disturbances of embarrassment; they stammer and stutter, they breathe badly and talk far too quickly. And when, without previous exercise, they are obliged to use their voice and speech in their vocation, they tire and soon show signs of exhaustion. The schools might help much, and, at least, it is the duty of colleges to teach and practise these future teachers, preachers, politicians, and officers more in the art of speaking than is the case.

The hygiene of speech and the aesthetics of speaking are equally important parts of the same branch of education. According to my own observations, which are fairly extensive, the disturbances of the voice among singers and those of the other occupations mentioned above, of which there is a large and constantly increasing number of cases, will be reduced when greater value is attached to the technical side of extempore speaking in schools and to practical and theoretical training in the technics of speaking.

The prophylaxis of early exhaustion of the larynx is most important for all who have to use the voice professionally. Not only singers, but orators, actors, officers, and preachers form a contingent of the great army of those who, as the result of wrong use of the organs of speech, are liable to find themselves unfitted for their work. This wrong treatment need not necessarily rest on any wrong management of the voice in the beginning. It may be caused by excessive use; and it is worthy of mention that the results of the mere physical overstrain by hours of consecutive speaking in many professions are not known and taken into consideration. Actors, singers, and some speakers are in the habit of carefully training and practising before undertaking anything which requires great exertion; moreover most of those who follow these professions have had years of previous practice. On the other hand, it has often ex-

cited my astonishment to see with how little care school teachers are prepared for their work. To give lectures two and even three hours in succession, and this several times a day, is not a rare occurrence in the teacher's work; very often those who overtask themselves thus are weakly, and often the atmosphere is unhealthy. Evil results generally follow. The vocal apparatus of singers will react minutely to every misuse. The artistic musical requirements demanded of the trained singer most quickly show every defect, every backward step. During the period of his training they are also evident enough. The chief symptoms of all conditions of laryngeal exhaustion which then occur are a feeling of tiredness after very little work and the various forms of disturbed sensation that are apt to accompany disease and exhaustion of the upper air-passages. When there is no perceptible mechanical cause to be discovered, the chief cause is a wrong method of tone-production taught by bad teachers or acquired by overstrain, which manifests itself acoustically as a disturbance in intonation first affecting its purity and then its intensity.

I have shown that it will be a serious matter if these early forms of vocal disturbance are unrecognized or unnoticed; I have described the early symptoms exactly and shown that they lead insidiously and gradually to graver defects which mean indeed the loss of the voice for singing. The disturbances of the speaking voice which hinder its activity as required by the orator or actor, by the preacher or officer, give rise *mutatis mutandis* to similar signs of exhaustion and inability to do the desired work. They are generally not recognized till later, but are open to the same means of diagnosis and of treatment. Acting upon the assumption that one who can detect a slight disturbance will not fail to detect a greater one, I will give a few brief statements upon this subject, which relate to the early forms of laryngeal vocal disturbance in singers. These will also be useful, I think, when describing the general prophylactic measures available. The nature of the disturbances in intonation with which we must begin consists in

this—that when the accustomed nervous impulse is set in motion, which should with a certain position, and tension of the vocal cords and a certain current of breath clearly produce the desired tone, a difference is perceptible between the tone emitted and that which was desired. To take a typical case as an example, we will assume—and it is very common—that the disturbance is only an acoustic one, moreover that it is only perceptible at one or two limited places in the range of the voice when the sound is weak, and that the sound emitted is deeper than was wished. From these preliminary statements—which as I need scarcely say are the outcome of the examination of many individual cases—the attentive reader will be able to derive many useful hints about doubtful and questionable points. The next point to be considered is that such a slight functional disturbance is evident also to other musical ears, and above all to the singing master; then we shall consider how far the recognition of commencing disturbance in intonation is a sign that medical aid should be sought.

My experience is that the trained, educated singer does not fail to notice these disturbances in intonation in their earliest form; but that most teachers of singing seem not to understand and recognize this stage. In very many cases I have found, alas, that when the pupil has mentioned the matter to his singing master he has been advised to continue with his singing. Then the further course of the vocal disturbance is generally this—that the original disturbance in intonation which affected only parts of the range of the voice extends, until in advanced cases the entire compass of the voice may at last be affected. Further, we find that the disturbance affects no longer only the commencement of intonation and the weaker sounds, but that the whole period of intonation and all sounds are false.

How is this to be explained? The educated trained singer has the power of always emitting the intended tone at a certain pitch, with the same intensity and the same degree of vibration of the cords; for this, in addition to

the ordinary methods of giving colour to tone, he resorts to a number of shades of tone which are produced by calling into use the tensors and adductors in other than their usual relation to their antagonists. The extreme limits of these possibilities, which we call physiological for the voice, are not recognized in singing. They lead from the ideal minimum of tension and adduction of the vocal cords gradually to that degree of relaxation which permits only a whisper; on the other side, they can reach to that maximum of tension and adduction which characterizes the position of occlusion.

Every singer knows and can control the various methods of emitting sound, of the same pitch and same rate of vibration, so as to maintain at a certain intensity a pure sound.

The first indication of the disturbance in intonation with which we are here concerned is almost invariably that this power is lost for certain parts of the compass, and those tones can only then be produced with a relatively increased tension and adduction. This may usually be regarded as the effect of the increased effort which had to be made, though possibly only for a brief interval, in order to overcome some mechanical obstruction; that is to say, the man has sung, although there was catarrh of the larynx, with slight mechanical changes, and these changes were such that the ordinary effort of the tensors and adductors relatively to their antagonists no longer sufficed for the work. It is astonishing how quickly insufficiency then appears, especially in those highest accomplishments which have been acquired by long training and always at the same place in the compass. It is always the highest tones and the transitions which are first affected in these disturbances, and thus we always notice first that the power of holding on to a pure sound begins to be lost. If the attempt is made, we hear regularly in recent and slight cases a lower sound than was intended. I said above that most singers are well able to detect the commencement of this disturbance; their correct musical ear makes them aware of this functional disturbance from the very begin-

ning, while the appreciation of the movements of the vocal cords acquired by long practice is obviously lost very soon after the disturbance of intonation sets in. Consequently if this signal given by the ear is neglected through the patient's own folly or through the ignorance of the teacher, an incurable habit in intonation is formed, and this false intonation will come to be felt as correct, just as a pianist who, compelled constantly to play upon a piano which is out of tune, acquiesces at last in false tones which at first would have driven him to desperation.

The loss of the idea of the movements of the cords and the fact that the power of controlling sounds by the ear becomes weakened, affords part of the explanation why disturbances in intonation develop so very rapidly and are so persistent. The other part of the explanation is to be found in the symptoms of early fatigue caused by continual excessive use of the tensors and adductors in singing. The more the patient sings the more rapidly and early will symptoms of fatigue and exhaustion set in, and the more rapid and extensive will be the progress of the muscular inefficiency over the greater parts of the range of the voice. In the oldest and most severe cases of this kind we find at those places of the range first affected, that the attempt to commence the tone is a complete failure, a stage of waste of breath, and is followed later by a tone which is markedly lowered. But this serious laryngeal loss of power may only be noticeable when the attempt to sing is made, it does not affect the speaking voice ; neither does a laryngoscopic examination show any disturbances of mobility which would explain the serious functional disturbance in the singing voice.

Whenever the disturbance has progressed thus far, it falls in reality under the subject of loss of voice ; this is certainly the case when the loss no longer affects only isolated tones but a fairly large part of the vocal range. In reality, every diffuse disturbance in intonation which is the result of a chronic insufficiency of the laryngeal muscles will certainly sooner or later lead to loss of the

singing voice, and this will be the more rapid, the more zealously singing is continued during this stage. It is not for me here to consider the clinical aspect of these disturbances in intonation as thoroughly as the importance and nature of this loss of power of singing would demand. I can therefore only briefly point out that it is accompanied not seldom by other disturbances in the singing voice from the very beginning, and that in the course of what was first an isolated disturbance in intonation, other disturbances may arise. From what has been said it will be evident that when cure of the disease is possible, it will be the more easily and rapidly cured the earlier the treatment is commenced.

The two chief principles of individual prophylaxis will be easily understood after the above description of these disturbances. The organ must only by suitable training be gradually fitted for the more difficult and greater demands upon it; and if disturbances arise which make easy and effortless phonation impossible or difficult, the demands made upon the voice must be correspondingly reduced or altogether given up.

All this seems very simple and self-evident. But there are no hygienic rules so much neglected as are these. In the works on voice production, written by authorities on the subject, the complaint is constantly made that no other subject is taught by so many unqualified instructors. It has been said that most singing masters think that the majority of singing masters are of no use, and they are, alas! right. But we must not forget that the few exceptions stand out the more conspicuously and have done excellent work; and from these laryngologists can and should learn very much. On the other hand, laryngologists are in a better position to know what great and untold harm is caused by incapable teachers, because often they are the next to whom these unfortunate victims go. The best prophylactic measure would be a regulation requiring all persons who desire to teach voice production to have some certificate from the State to show that they are capable. In so very important and responsible a calling as that of

the professional training of the voice, teachers are allowed to work in ignorance. How very different it would be if some amount of knowledge of voice hygiene and physiology were required of all instructors in singing. And singers, actors and orators would not risk their voice and future career, as so often happens, did they possess a general knowledge of the structure of the vocal apparatus and of the hygiene of the voice. How often we hear a hoarse singer worrying himself and his audience for a whole evening, and how little regard the stage manager shows towards his artistes. A certificate of fitness should therefore be demanded from those who teach and the pupils should be taught how to treat the organ of voice in singing and in speaking, so that they may at least be protected against the most serious results of misuse of the voice.

Before leaving these simple inflammatory processes and passing on to the prophylaxis of constitutional disease, we have still to consider a few special forms of disease which have this in common with the previous ones, that their local treatment becomes the more difficult and more unfavourable the longer it is postponed. There are first the processes which an examination reveals, such as atrophy of the mucous membrane. Probably these include several different pathological and anatomical processes which do not come under examination at their commencement, and whose nature is still obscure in spite of numerous attempts to explain them. We find also in the nose more or less advanced rarefaction of the deeper structure of the wall and of the bony structure of the turbinates. The best known is atrophic rhinitis or ozaena.[1] I incline to the

[1] Since Stoerk drew attention to it, the suspicion has often been repeated that "ozaena" is of syphilitic nature or at least a residual form of an earlier syphilitic process. But when we remember that there is scarcely any illness whose aetiology is obscure where we do not suspect such a "connection," and when we know that the disease is quite uninfluenced by antisyphilitic treatment, then these conjectures do not concern us much in our therapeutic and prophylactic efforts. True nasal syphilis is, naturally, not included in these remarks.

opinion that the recognition of the earlier stages will be most likely to render it possible to employ prophylactic measures. In that way our endeavours to effect a real cure by local and dietetic treatment will be crowned with success. In these cases, where the mischief is recent, the patient young and the general treatment energetic, comparatively simple methods of local treatment will suffice. Simple irrigations and painting, together with massage and the administration of mild iodine preparations, may suffice and effect a permanent cure in a few months, where later and more unfavourable conditions might require more severe methods for a longer time. Among the most effectual factors in general treatment, we must not forget sea air and sea baths. Catti is of opinion that the basis of the development of ozaena is the involvement of the nose in acute infective diseases. He considers that many an ozaena might be prevented if, for example, scarlatinal rhinitis were diagnosed and treated as early as possible.

In many cases we meet with patients who have for years been treated for pharyngitis and laryngitis but without success. Many of these patients owe their throat trouble to some affection of the nose which hinders nasal respiration. No matter whether secondary irritation or chronic catarrhal processes have developed in the deeper parts or not, the recognition and cure of the primary nasal trouble is the appropriate treatment for the secondary disease and irritation.

We must never, as was formerly often the case before the nasal cavity was so well investigated as now, rest content with the mere observation and treatment of the deeper parts. Many a "pharyngitis" which had long resisted all applications and gargles disappeared of itself where the nasal respiration was made free. The mere local treatment of the primary nasal trouble, as was before stated, is not all. Rather must we find out the special cause of it and adopt general treatment which is suitable.

As a curiosity I must mention a local prophylactic which the patients often themselves adopt to prevent the dreaded

return of rhinitis. This consists in the regular use of nasal douches and similar irrigations, much prescribed also by hydropathists, who are now so much in favour. We are often told after a time, when for any reason we have been obliged to apply some local treatment, that the patient has made use of this method—now, unfortunately, so popular—for many years. In other cases, complaints are made of all sorts of conditions of irritation for which, after the most careful examination, we can find no cause. Since my attention was drawn to it, I now always ask these patients about nasal douching—and not at all rarely I find that with the discontinuance of this superfluous irritation all the troubles disappear leaving no trace behind them.

The frequent cases of acquired adhesions in the upper air-passages draw our attention to those forms which are the result of medical interference, and might consequently in a certain number of cases be prevented. It must be granted that in some cases the deformity has been caused because the patient has not carried out the after-treatment. If they are early told what will be the consequences of such neglect, the physician cannot be held responsible. But I have also seen and occasionally described very serious cases where extensive intranasal adhesions have arisen through treatment with caustics. Prophylaxis consists in this, that we must carefully avoid applications to surfaces which lie against adjacent parts of the wall. Special care must be observed in applying the galvano-cautery, so as to form wounds, when at the same time there is some thickening, distortion or outgrowth of the septum which makes the introduction and application of the galvano-cautery difficult. In comparison with these acquired intranasal deformities, similar throat deformities are rarely seen, although in the removal of enlarged pharyngeal tonsils and adenoid growths, some injury to the hinder surface of the soft palate is probably sometimes inflicted. Evidently the mobility of this part and the position which it mostly assumes in the upper part of the naso-pharynx away from the posterior wall are not favour-

able to adhesion. However, in the removal of adenoid growths by an instrument, I would advise that the soft palate be protected by a palate retractor. After repeated and somewhat too extensive treatment of the tonsillar region with the galvano-cautery, we sometimes see adhesions between the posterior pillar of the fauces and the posterior pharyngeal wall, where it may set up very active irritation.

The danger in operations on the larynx of causing adhesions is the greater, the nearer they are to the anterior commissure, and the more symmetrical the operation wounds are if made at the same time or at very short intervals. After the removal of broad-based tumours cicatrices may form partly occluding the larynx. If they are narrow in the sagittal diameter, they are of course without significance, but directly they offer any impediment to respiration, an attempt must be made to remove them, and this is not always easy as it often requires very careful and prolonged after-treatment to prevent them from growing again. On the other hand it is obvious that such partial deformities cannot always be prevented.

II. Special Prophylaxis

Rhinological and laryngological prophylaxis in acute infectious diseases in children and young people consists partly in the care and appropriate treatment of the patient himself, but in severe cases of the disease or in an epidemic, it may be of greater importance to order protective measures for those around the patient. In all these diseases it is almost equally important, before there is any disease, to adopt general measures to protect this important region of the upper respiratory passage from lesions and disease in the same way as we endeavour to raise the power of resistance of the individual. Among these must be included the prevention of the numerous small injuries to which the entrance to the nostril and the septum, where they can be reached by the finger, are especially ex-

posed. It is not always simply the bad habits of children with which we have to contend. Careful examination often shows either some remote cause (irritation of worms) or some local cause. Among these are foreign bodies, eczema and troublesome accumulations of secretion. Experience shows that even in the febrile stage of many children's diseases there is considerable swelling of the adenoid tissue in the throat, therefore while the child is still well this condition should receive attention, the more so when some obstruction to breathing or swallowing is caused thereby; for when some serious disease sets in, this may become the more dangerous because swelling and disease affecting the deeper parts add to the obstruction to respiration, and hinder nutrition, even if the child be not less capable of resisting the acute infective process because it breathes badly and is ill-nourished. Moreover, the care of the mouth and a good condition of the teeth are important in connection with all infective diseases. Much more ought to be done for the poorer and middle classes in this matter. The dental department of hospitals should have means to enable them to adopt conservative treatment for their patients, gratis, and workpeople should be continually instructed about the great significance of early treatment of the teeth.

These prophylactic measures are the more important in connection with the nose and larynx, because any adequate local treatment during the acme of febrile diseases is impossible. The most we can then do is to observe and check the morbid processes, and if we decide upon any local treatment, this must be very cautiously carried out, and cannot comprise more than a cleansing of the part attacked or purely palliative treatment.

The following remarks about the various infective diseases cannot claim and are not intended to be exhaustive; many points about these diseases are omitted, because with the exception of the preventive measures described above, while the individual is still well, nothing or next to nothing can be done when the disease has once set in.

Erysipelas serves as a type. There we can most clearly see

in which direction prophylaxis is possible: the aim must be to keep the mucous membrane and apertures healthy and the teeth sound. If the patient has previously had an attack, greater care should be taken to remove all causes which might produce small lesions in the situations mentioned. But we must also caution one who is prone to erysipelas to be very careful to wash and disinfect his hands, especially when there is any irritation at the inlets to the upper respiratory passage, which might lead him to touch, rub or scratch them.

When erysipelas has once developed, very little can be done. It is always well, in order to protect the individual from subsequent attacks, to find out the point at which an entrance was effected. The direction in which it spreads may give a clue. It may begin as a cutaneous erysipelas which then spreads to neighbouring mucous surfaces. Or, conversely, the disease may begin as a nasal, pharyngeal or laryngeal erysipelas and then secondarily affect the skin. Lastly, it is important, in regard to prophylaxis, to know that occasionally erysipelas may be caused from within through some suppurating focus; this will indicate the direction which preventive treatment must follow, when the acute symptoms are over and examination has shown how the process developed.

Another though less common disease in which preventive measures are the best treatment for the disease is glanders. Fortunately the predisposition to this disease in man is not great. The prognosis for this disease in man is bad, both in the acute form and in the more chronic. Those who have the care of horses should be carefully instructed in the importance of the disease, the more so, as they are men whose ignorance tends to make them underestimate the danger. There is the additional fact, as Landgraf points out, that the disease in horses often runs an insidious and slow course which makes its recognition very difficult. According to Schneidemühl the disease is generally conveyed to man by the pus, blood or nasal secretion of animals which are ill or have died; small particles of these get into minute wounds of the skin or on to the conjunctiva or buccal

mucous membrane. Landgraf repeats the old advice, never to wipe away the nasal secretion of a horse with a handkerchief.

Involvement of the upper air-passages in measles in scarlatina, in typhoid and in influenza shows great variability. It depends on the one hand upon the special character of the epidemic, and on the other hand, probably upon individual factors, such as the condition and power of resistance in these parts before infection occurs. I may mention in connection with measles the peculiarity that in some epidemics the ear is involved. In other epidemics again, we find regularly during convalescence, disease of the lymphatic tissues, and in other epidemics, very little or none. Sometimes there is only very little new tissue in itself but it is superimposed upon already existing chronic hyperplasia.

In scarlatina too, as in all acute infective diseases, the treatment of the mouth and teeth and of all causes which obstruct nasal respiration is the best preventive, and is available while the individual is still in good health.

Locally, during the course of the disease all energetic treatment must be avoided; but the scarlatinal rhinitis or rhinopharyngitis must be carefully watched to prevent extension to neighbouring or to deeper parts and to alleviate the condition by early treatment. The accessory nasal cavities and the middle ear have first to be considered; but we must also bear in mind that retropharyngeal abscess is by no means a rare complication of scarlatina, and its early symptoms, stiffness in the neck and throat, pain on swallowing and a rise of the temperature may be easily overlooked. The palliative treatment of scarlatinal purulent rhinitis and pharyngitis consists in simple gargling, and washing out or spraying with a five to ten per cent. solution of hydrogen peroxide.

In typhoid fever, the milder cases in which the upper air-passages are involved are often overlooked and no harm results therefrom. Pharyngeal and laryngeal affections are more common in typhoid than are nasal complications.

But nasal haemorrhages may occasionally be very severe and require treatment. As to the cause, Landgraf agrees with Tissier in thinking that erosion and not congestion is the cause—an opinion which is important in deciding upon the prophylactic and curative treatment to be adopted. Typhoid and erysipelas, scarlatina and small pox belong to those diseases in which, if possible, examination of the throat is indicated to detect laryngeal complications, and it may sometimes be required up to the date of convalescence. Superficial lesions may give rise to no symptoms or their symptoms may be masked by others. Even severe perichondritis may escape detection through stupor and prostration, although generally these lesions show themselves by fairly sudden symptoms of laryngeal or tracheal obstruction.

When stridor sets in during an apparently favourable convalescence, accompanied by a feeling of great anxiety with inspiratory obstruction and dyspnoea, going on to cyanosis, it urgently needs relief, or death by asphyxia will result. Laryngoscopic examination may lead to prophylactic treatment which will save life, but it should not be forgotten that this method of examination does not always give us definite information about the intensity of the process—and that the prognosis in pharyngeal or laryngeal complications of typhoid must always be given very cautiously. In perichondritis in typhoid the prognosis is especially bad and there is no real prophylactic treatment; to prevent death from asphyxia, the indications are to open abscesses and to perform tracheotomy.

The most careful attention must therefore be given by the physician and by the nurses to prophylactic treatment both at the commencement and during the course of the disease. Most important is the regular and careful treatment of the mouth and teeth.

The involvement of the upper air-passages in influenza is so variable that in many cases the most careful examination reveals no changes in those parts, because each separate part of the respiratory tract, even the deep parts, may be affected independently of the others. On the other hand

serious changes in the upper air-passages may occur and the rhinitis may extend to the accessory nasal cavities. Perhaps the increase in chronic affections of the accessory nasal cavities after influenza epidemics depends partly upon some special conditions which are unknown to us; but we must remember that many of these diseases are overlooked in the acute stage because their symptoms, pains in the head, and purulent or muco-purulent discharge, are masked by the primary rhinitis and rhinopharyngitis, when the mirror is not used for examination. This non-recognition of the acute disease of the accessory nasal cavities at the commencement and during the course of influenza explains part of the great increase in chronic disease of the accessory nasal cavities which has been observed since the first influenza epidemic, and which has given rise to some of the worst and most tedious cases of purulent affections of these parts. Since experience shows that many of these diseases are really complications or extensions of the morbid conditions of the febrile stage, careful rhinoscopic and laryngoscopic examinations of the patient should be made, so far as the general condition of the patient admits of them. Elsewhere I have pointed out that this examination is as important as the physical examination of the chest and should go hand in hand with it. Obviously in the acute stage the nasal catarrh cannot be very thoroughly treated, and all irritation and transference of infective material must be avoided. As a prophylactic I regard treatment of the mouth by washing it out regularly after every meal and cleansing of the teeth as most useful from the beginning of the illness. If the accessory cavities are involved and the discharge is serous or mucous, we may wait. Even with suppuration, if the symptoms are not urgent enough to require active interference, we may wait for a time to see whether simple measures, and the provision of free drainage by removing any obstruction will suffice to bring about spontaneous cure in this acute stage. If it cannot be thus cured, the further measures required to prevent the

process from becoming chronic and setting up all kinds of irreparable damage are to expose fully the diseased part by operation as soon as the patient's general condition permits.

With the pathological knowledge of the present day and the advances made in treatment, the prophylaxis against diphtheria can be fairly concisely stated. For the protection of the healthy, immediate and strict isolation of the patient suffering from diphtheria is necessary, and of all who are suspected of having the disease. Isolation should be continued until examination shows that there are no more diphtheria bacilli present; afterwards the room should be thoroughly disinfected. Notification is essential for the carrying out of these measures. But we must not forget that this may very often be evaded if the present "nature-healing" is permitted to go on. I had an opportunity once of seeing what occurred when some children suspected of having diphtheria were treated by the parents by "natural" methods, without calling in any doctor. The hygienic conditions defy description.

This deficiency in the law should be made good. If these well meant and useful prophylactic regulations by our sanitary authorities are to be effectual, such evasion should be made more difficult than at present it is. I know there are difficulties in getting this carried out, but without any great infringement of personal rights the duty of notification might be extended in order that strict and immediate isolation may be secured even amongst those who do not call in a doctor. But many more places are needed than at present exist where bacteriological examinations can be quickly made to settle the diagnosis in doubtful cases, and these should be free of charge for all. The State must provide these additional means of diagnosis if those suspected of having diphtheria are also to be isolated.

The local treatment with antiseptics or caustics which was formerly used has largely been given up, to the advantage of the patient, now that the serum treatment is more frequently used. With this decrease of active

local treatment, severe intranasal adhesions have been much less common, those which are still met with are the result of ulcerative processes and cannot be prevented by prophylactic measures.

The prophylaxis of tuberculosis to which we must now turn our attention, might really have been mentioned when speaking of some of the acute infective diseases, namely those which are followed by a predisposition to tuberculous disease. Next to measles, we should have to mention influenza in this connection. And it is therefore the duty of the physician in charge constantly to use his eyes and his ears. When the signs of catarrh do not wholly clear up, or the patient has formerly suffered from tuberculosis, or there is a family or individual predisposition to it, we must watch the physical signs with increased care and early and frequently examine the sputum for bacilli.

The prophylaxis in tuberculous disease of the throat coincides within certain limits with the prophylaxis of tuberculosis in general. There are some cases of tuberculous disease in the upper air-passages, in which other organs may also be diseased though their clinical significance is less. Another group consists of those cases of tuberculous disease of the lungs where there are no obvious changes in the upper air-passages; here the object of prophylaxis is to protect these and so far as it is possible to render them more capable of resistance. The prophylactic treatment of tuberculosis can under present conditions only be partial, because it is not only a question of hygiene and medicine, but also a social question. Philanthropists will therefore welcome the fact that in recent years some eminent physicians, with power of organization, have inaugurated and inspired movements to provide sanatoria for the poor and those of small means where they can be cured, or at least be relieved. Rest and good nursing combined with suitable general and local treatment are there available, and these factors will do very much more good for these poor patients than a short stay in a warm climate, which is obtained under consider-

able difficulties, yet after it the patient is obliged to go back to the old conditions, for he generally has the idea that such a change of climate will "cure" him completely in four to six weeks.

We hope that the number of cases of late diagnosis of tuberculosis will become ever smaller. In clinical work there is seldom an opportunity of studying cases in the earliest stage that admits of diagnosis. Instruction should also be given about cases in which we must not wait for signs. It is not to the interest of our patients who are threatened with tuberculosis that we allow them to get ill before treating them. In these cases we ought to anticipate and carefully, gradually and scientifically draw upon our preventive means: air and diet, activity of the skin and muscles, exercises, games, sports adapted to the individual, and subsequently careful watching even for years. Those predisposed to tuberculosis should be strengthened, the weak narrow chest should be enlarged up to its normal so far as age still permits, catarrhs should be carefully watched and treated till completely well; these are the chief objects of this earliest, wisest and most successful prophylaxis.

The next stage is that where there are already signs of disease in the upper air-passages. The frequency with which the various parts are attacked increases as we pass downwards from the nose, and this is just the opposite of what takes place in the case of simple catarrh. This fact in my opinion tells on the whole against primary disease of the throat. But we should not be misled thereby, as so often is the case, and regard examination of the nose and naso-pharynx as superfluous, because the presence of chronic rhinitis and rhinopharyngitis may be of clinical value. And though obviously tubercle bacilli can be more easily removed from the nose and throat than from the larynx, yet most observers agree that the bacilli are more apt to settle at spots where there is chronic catarrh or frequent acute attacks. On the other hand when early symptoms are present, we must not over-value the laryngoscopic examination. I have shown that often the changes can-

not be detected by careful laryngoscopic examination because they are not sufficiently large to be seen; and further when a small localized change is regarded as an early stage, we must remember that deeper and more extensive changes may be present. Lastly it is doubtful whether miliary infiltration with or without obvious tuberculous changes, may not appear in the form of a persistent chronic catarrh, or nutritional disturbance in the mucous membrane. Observers long ago regarded it as an important sign of bad omen if in examining the throat they found well-marked anaemia of the mucous membrane of the throat, sharply limited by the anterior palatine arch. We find it not only in well advanced lung disease but sometimes also in early stages, and though I am far from regarding it as pathognomonic, yet it is a sign which may be of significance for prophylaxis. Equally significant are hyperaesthesia and pain localized in the pharynx and larynx.

The question whether in tuberculous lung affections it is possible by prophylactic measures to prevent laryngeal complications cannot be answered with certainty. This much is certain, that it is our duty to treat most carefully in these patients the very slightest catarrh, to which in others little attention would be paid. Persistent irritation in the pharynx, kept up by nasal obstruction, should be prevented by removing the obstruction. But I am not an advocate of any heroic measures or interference accompanied by haemorrhage, or of resection and similar operations on the septum and turbinate bones, such as I find to my astonishment to be a fairly common practice in some of the German sanatoria for the treatment of lung disease. These operations are not well borne by the patient, and I would recommend in preference, local applications, massage, electrolysis, and the galvano-cautery as less weakening. All these require to be carefully used by skilled hands. The recent enquiries and investigations into the subject of tonsillar tuberculosis do not, it seems to me, justify us in removing masses of hypertrophied lympathic tissues in tuberculous patients, unless they really obstruct respiration or hinder

nutrition by interfering with deglutition or reduce the patient's strength by becoming frequently inflamed. We cannot here enter into the much disputed question of the local treatment of laryngeal tuberculosis except in so far as is necessary for describing prophylaxis. In this connection I can speak favourably of prophylactic tracheotomy recommended by Moritz Schmidt. It may, I have found even in apparently desperate cases, not only save the patient from asphyxia, but by rest and shrinking of the infiltrated parts and greater ease in swallowing ensure a period of comparatively great improvement in health.

Local surgical treatment of the earliest forms of laryngeal tuberculosis would, if we were sure that it would prevent further development of the process, be extremely important in prophylaxis. But we can scarcely even hold out this promise; the method can only be tentative, and we have moreover to remember that we cannot be sufficiently sure, by laryngoscopic examination, what widespread miliary infection may perhaps be present in addition to the visible, localized infiltration. And further, in ineffectual endolaryngeal operations there is the danger that the operation itself may make the process more rapid if it is not sufficiently extensive, and may also cause a spreading of the disease. In superficial and extensive infiltration, I therefore recommend electrolysis to be tried. I must add that two years ago Schmidthuisen recommended the galvanocautery, and recorded a successful case where there had been extensive infiltration; he showed also a series of very useful spiral galvano-cauteries for the purpose. This led me to try the method for cases of early slight infiltration and small ulcers, using it as Schmidthuisen recommended; in some cases the local result was permanent and the patient's general condition much improved. In one case of improvement, the cure has lasted now for more than a year. During the whole time open air and dietetic treatment were also adopted, though without any change of locality. These measures alone had been employed without any benefit before the local treatment was tried, and it may therefore be said that in similar cases local treatment may be a valuable

factor for the prevention of extension of laryngeal tuberculosis.

Treatment with tuberculin has been given up probably by most physicians. My own experience both of the old and of the new preparations is such that I do not recommend its use as a preventive.

Wherever sick people regularly and permanently inhabit certain rooms, it has recently been shown to be necessary to adopt every hygienic measure in the arrangement of the rooms, in the care of the patients and in making all the secretions and excretions harmless. Similar prophylactic hygienic measures are now expected also in schools and in all institutions, where young people congregate together regularly and for long periods, and where, although they do not live together day and night as in hospitals and boarding schools, they are exposed to similar dangers. The danger may even be greater because in schools many a carrier of infection is smuggled in or admitted by mistake, and may be a source of danger to his neighbours. When school physicians are appointed to all schools, including the higher schools, they must be empowered to act not only in reference to the scholars, but also in reference to the teachers who are ill. I remember from my own school days a teacher who preferred sitting near the middle of the pupils, and who was extremely objectionable to us because he expectorated so much and so often in an unpleasant way. The expectoration of scholars and of teachers should be made innocuous. The spitting vessels should contain some water and should be made so that they cannot be upset or thrown over. Hugo Wolf suggests that children who have a cough and expectorate should be put in a corner seat and should have a spitting vessel beside them. These regulations should not apply to tuberculous children only; I have lately known of healthy and strong children suffering from bronchitis of a very striking and obstinate nature. Finally it was discovered that these children sat close to others who had chronic disease of the organs of respiration, or next to children convalescent after measles and some acute febrile disease of childhood, who still coughed and expectorated,

and had evidently not been kept long enough away from school. Every physician who has met with these cases will welcome the appointment of school physicians, because the prophylaxis of tuberculosis is both difficult and important. Care in cleanliness and ventilation, in diagnosing sick children, in permitting them to attend school, and in their supervision—all these become of the greatest importance when tuberculous children have to be dealt with. Often it will be difficult to do justice to the sick child and at the same time protect the healthy children. In this case we must decide on doing what will be best for the healthy.

The prophylaxis of syphilis has to be considered in two aspects; one is the prophylaxis of infection. The wish to be protected against infection is only as a rule thought of in connection with genital infection. But one must not forget that infection may be conveyed by utensils, and in eating and in washing, and by other objects to which the poison of syphilis clings. In this connection we are also specially interested with those cases of primary syphilis of these parts which are known to have been caused by dental instruments, and also by aural instruments, such as the Eustachian catheter. Among these, we find mostly primary affections of the nasopharynx; nasal examinations which are so common seem to have caused infection in very few cases only. Primary affections in the upper respiratory tract are often not recognized, especially in their rarer situations at the nares and deeper parts of the pharynx—they have also been found on the epiglottis. Early diagnosis is the best and most important prophylactic, for they are often first seen in the form of ulceration, and are often mistaken and wrongly treated. But like the corresponding genital forms, they often assume a phagedaemic character, and one tonsil may also be infected by the other. I described such a case where in a young girl a chancre appeared on the left tonsil. The tonsil was much enlarged and bluish-red, and on its anterior surface was an ulcer which spread towards the middle line and was surrounded by a ring of yellow-grey deposit, and in the

middle was brownish black. The condition had been pronounced to be diphtheria; a few days before the admission of the patient a similar swelling of the other tonsil appeared opposite to the sore on the first tonsil, and this already showed a similar deposit.

Secondary signs are also frequently mistaken. Syphilitic erythema of the nose and throat, and syphilitic tonsillitis are often taken for simple catarrhal symptoms; mucous tubercles are very seldom recognized when localized exclusively in the naso-pharynx and when there are not at the same time changes in the mucous membrane or in the skin, which are more visible. Mucous patches in the mouth may also be sometimes missed as they may be not very easily seen. According as the situation gets lower in the larynx, the tendency to the deeper destructive forms increases and the milder forms are rarer, yet the milder pharyngeal syphilides may sometimes extend to the larynx, and for this reason too, early diagnosis and treatment are important. During the first three years after infection, the upper respiratory tract should be thoroughly examined; according to Michelson, this is also the favourite period for the later syphilides of the mucous membrane. In fifty per cent. of the cases collected by him he found gummatous ulcerative rhinitis complicated with specific disease of the throat and naso-pharynx. The danger to life and health of this gummatous infiltration in the upper air-passages is not altogether unrecognized by the public now-a-days. Perichondritis and periostitis of the nasal septum, gumma of the turbinates, sequestra from the ethmoid bone, destruction of the hard or soft palate are among the most important. But gumma of the naso-pharynx also merits attention if irremediable mischief is to be prevented. Careful and thorough examination is required, although the symptoms are comparatively slight when the destruction is rapid and quickly affects the deeper parts. The most favourite places are the hinder surface of the soft palate, the neighbourhood of the Eustachian tube, and the posterior pharyngeal wall. Gummatous infiltration of the posterior surface of the soft

palate leads to perforation; the difficulties in deglutition and in speech which are caused thereby are the greater, the more extensive and the nearer the gummata are to the hard palate. It is extremely important in order to prevent these disturbances that the mischief should be early recognized. For although the ulceration may afterwards heal, perforation is left with difficulties in deglutition and in speech, and this will considerably curtail the enjoyment of life, especially in educated people, and we should not be content with such a result. Considering the uncertainty of the result of a staphyloraphy for syphilitic ulceration our duty is to tell the patient that it is an attempt to close the hole by operation, but that we cannot be certain beforehand about the result. Moreover, we must have as little strain as possible upon the stitches. I have shown in several cases how much better the chances of healing are for merely mechanical reasons, if the line of suture is everywhere in the horizontal direction. In adults, the disturbance in deglutition alone disappears at first if the operation is successful, and the nasal voice will need special instruction and exercise in speaking. But the disturbance in speech may be easily cured even when there is considerable shortening of the soft palate.

Another reason why prophylaxis requires early recognition and treatment of pharyngeal ulceration is, that there is a tendency for ulcers on the posterior pharyngeal wall to progress quickly in the direction of the cervical vertebræ, where they may cause periostitis and caries—and moreover there is a tendency to rapid and extensive adhesions when ulcerating surfaces come into contact; hence the danger of ulceration between the posterior surface of the velum and the posterior pharyngeal wall in the neighbourhood of the Eustachian tubes, and of the spread of ulceration in the mouth and pharynx and to the larynx. In other words, neglect and error in diagnosis lead to the most serious consequences in the region of the upper air-passages, because the most extensive destruction and malformations may be produced there. There is a very general complaint of physicians that patients with nasal

syphilis mostly come for treatment at so late a stage that there is advanced ulceration and loss of tissue has occurred, which cannot be restored, or only with difficulty; and however much we may feel inclined to lay the blame of this on the insidious onset of the disease and the very slight symptoms, our defective knowledge of pathology and the defective methods of examination also co-operate. Inefficient prophylaxis may also be due to the fact that the gummatous processes in the upper air-passages are frequently the earliest and, for a long time, the only signs of a recrudescent syphilis. If these are overlooked or not diagnosed, the opportunity may easily be missed of preventing the spread of syphilis to near or distant vital organs.

III. The Prophylaxis of Haemorrhages

The special consideration of one symptom which may proceed from very different causes is justified because at the moment when it appears, and therefore often at the moment of real danger, a certain number of cases require the same kind of treatment although we are unable to explain the aetiological connection. The real preventive treatment can often not be carried out till this dangerous symptom has subsided. Prophylaxis will be necessary to prevent recurrence, if possible by removing the known cause. When this is not possible, prophylaxis endeavours to protect the patient by telling him what he must do when haemorrhage recurs, to prevent the more serious conditions which may follow.

There is one other reason why a slight haemorrhage in the upper respiratory passage is significant. This is because of the importance of diagnosis from haemorrhages in the lower air-passages and pulmonary haemoptysis. And although we cannot be absolutely sure that there was no haemorrhage from the lungs, yet in the absence of any expectoration the discovery of a bleeding point in the upper air-passages may be regarded as a favourable sign.

If we omit accidental solutions of continuity which may affect any mucous membrane, the haemorrhages are mostly caused by conditions which a healthy mucosa can bear, but which act as traumata when its resistance is diminished. If, as in many forms of chronic rhinitis, we find the mucous membrane much thickened at certain places, while in other parts the superficial layers are so delicate that the slightest touch produces copious haemorrhage, the prophylaxis of such haemorrhage must be local treatment of the disease and thorough treatment of any near or remote cause. If the haemorrhage comes from granulation tissue, the latter must be removed, or the original focus of disease in the nasal wall or adjacent cavities be exposed. In the naso-pharynx and also in the larynx, the cause of the haemorrhage is sometimes to be found in small firmly-adherent masses of secretion. They act either by drying up and thus producing sharp, circumscribed pressure on continguous parts, or by being dislodged or coughed out from their substratum. It is important to look for and remove these masses, and then to prevent the recurrence of the condition by treating the primary disease. I have described a case where such an encrusted mass in the anterior wall of the trachea acting as a foreign body caused great trouble and frequent haemorrhage, which made me suspect phthisis. With the instrumental removal of the scab all troubles ceased. There is also a case of Sommerbrodt's in which a submucous haemorrhage of the size of a cherry-stone in the inter-arytaenoid space simulated a foreign body and caused similar troubles. It was situated between the posterior laryngeal wall and the mucous membrane of the pharynx, and was explained by him as having been caused by bruising of this part by a hard morsel of food.

More frequently small pointed foreign bodies are the cause of slight injuries with haemorrhage in the mouth or pharynx, most frequently in the crypts of the tonsils and at the base of the tongue. For the prophylactic treatment of these haemorrhages, a careful examination of this part must be made. If this were not so often

neglected, foreign bodies in the tonsils and concretions would not be so rarely discovered. The prophylactic treatment of the various morbid conditions which have caused these haemorrhages, must not as we have seen be restricted to local treatment. It must be extended to all those general or distant primary conditions which produce persistent and recurring catarrh or congestion. The nature of the primary cause may be such that local treatment must not be adopted, as for example when changes in the mucous membrane are associated with local changes in the vascular system, more especially when there is evidently one common cause of the two conditions. Most important amongst these causes are the peripheral obstructions caused by disease of the heart, kidneys and liver, and those which we trace to atheromatous degeneration. In the course of these diseases, permanent distension and over-filling of the veins may occur and finally a varicose condition arises. The knowledge and diagnosis of these conditions will prevent us from adopting local treatment which might unintentionally and unexpectedly injure these structures and lead to serious haemorrhage.

Among haemorrhages for which it may be questionable whether local treatment should be adopted are those puzzling vicarious haemorrhages. In making a diagnosis of vicarious haemorrhage we must be very careful that all local causes are really excluded. Here as well as in the analogous cases in the ear, there is always great difficulty because the commencement of the bleeding can scarcely ever be certainly seen. I can but repeat the advice that these cases must be approached with great caution and with special attention to the nervous system, and we must carefully exclude auto-suggestive influences which may so readily occur.

Among symptomatic haemorrhages from the upper respiratory passages, the early forms of acute infective diseases have a special cause and are amenable to treatment; they owe their origin to early catarrh and the aetiology is therefore similar to that stated above, namely that with some swelling or softening of the mucous

membrane, a trivial cause, such as sneezing, blowing the nose, or coughing may suffice to cause a solution of continuity. The best prophylaxis in such haemorrhage is not an attempt at local treatment—this ought always to be avoided in the early stage of acute catarrh; but we should rather endeavour to avoid or restrict the movements which induced the haemorrhage. Drugs should be given to diminish the tendency to coughing; secretions which are difficult to remove or which accumulate in large quantity should be removed by gentle gargling and careful washing out or by syringing the nose and nasopharynx. Violently blowing the nose must be forbidden. Bresgen was right in pointing out that the hygiene of the nose requires that patients should be told how to blow the nose; following his example, I always recommend in chronic catarrh and congestion, and after operations so soon as blowing of the nose is allowed, that the secretion should be blown out of one nostril only at a time, and that all great efforts in blowing should be avoided. Among the chief causes of the early forms of haemorrhage mentioned above are measles, scarlatina, diphtheria, German measles, and acute rheumatism.

The explanation is different in those haemorrhages which may occur during the later course of infectious processes; prophylactic treatment is scarcely possible here because they are caused by the characteristic exanthem or exudation. The same is true of haemorrhages from the upper respiratory passages which are the consequence of some change in the blood or general cachexia. Such are the late haemorrhages in smallpox, and the haemorrhages of leukaemia, pernicious anaemia, scurvy, purpura and chronic mercurialism. But in some diseases extravasations occur in which care and prophylactic measures may be useful: this is the case with whooping cough, where the haemorrhage may be regarded as the symptom of some injury in the same way as the conjunctival and cerebral haemorrhages which have also been observed. I would again repeat that such haemorrhages in adults may simulate phthisis when the symptoms

are not so marked and clear as in whooping cough in children and when the extravasations, as is usual, are small and not readily seen. I have described one case in which an exceptionally large extravasation was present, the whole mass of one vocal cord and the tissue below it being filled by it; this had been preceded by repeated small haemorrhages in which the blood had escaped externally. But when the large extravasation appeared, these ceased and aphonia with moderate dyspnoea set in. As a guide to the treatment required, I may mention that in such cases removal of the extravasation by puncture or incision may become necessary to relieve the dyspnoea. In the case described, this was not done because absorption soon occurred with suitable internal treatment (bromoform, quinine and belladonna), the extravasation was no longer so tense and the slight dyspnoea disappeared. Nevertheless, prophylaxis requires a very careful watch to be kept over these conditions, in order when necessary to prevent a sudden bursting with its accompanying dangers.

It is sufficiently obvious from what has been said, that in the sense of prophylaxis less stress is to be laid upon the treatment of such haemorrhage than upon the curative treatment of the disease which caused the haemorrhage. Thus slight haemorrhage which has been proved to come from the region of the upper air-passages does not always need any direct treatment. They may be left alone if the injurious conditions which caused them are avoided.

Blowing the nose while standing up must be avoided in nasal and pharyngeal haemorrhage; the patient must rest in the horizontal position, with the head moderately raised and inclined slightly backwards. Similarly, in haemorrhage from the larynx, coughing and clearing the throat must be suppressed; the external application of cold is a very useful aid in this. The treatment of the haemorrhage itself may increase in importance, if the constant recurrence of even a small haemorrhage or the general condition of the patient makes one fear the injurious consequences of the loss of blood. So too, when a haemorrhage slight in itself

continues for a long time and thus becomes troublesome. It deserves mention that in general medical practice the methods which are most successful and least troublesome to the patient are not always hit upon. And therefore in this description of prophylaxis we shall now consider some of the methods of local treatment which may be needed in addition to treatment of the primary cause.

The prophylaxis of haemorrhage includes the care of the nasal cavity and of the pharynx after operations, and strictly speaking, also the preparations to be made against severe haemorrhage which if not certainly expected may nevertheless, if they occur, cause sudden death, not so much by their severity as because the blood passes down the larynx, filling the air-passages. I may suggest here that the boldness of operators in these respects are in inverse proportion to the unexpected and unpleasant experiences they may have had. This is shown in the views held about tonsillotomy and now expressed by many; while some cannot understand why one is disinclined to use the tonsillotome or scalpel which have been successful in their hands in so many cases, without exception, there are others whose own unfortunate experience of post-operative haemorrhage makes them use the galvano-cautery only. The same is the case with removal of Luschka's tonsil, with operations for adenoid growths and the various small operations performed in the anterior nares; although the haemorrhage may be only slight and seem likely to cease early, one often may feel in doubt directly after the operation whether or not to use a plug as a prophylactic.

In removal of adenoids the danger of haemorrhage is generally so slight that such a preventive measure is very rarely indicated in the first few hours or first few days. It is advisable that the ring curette in this operation should only be used gently and not pressed forcibly against the roof of the pharynx. Neither is it at all pleasant for the operator when the curette breaks and even a portion of it remains behind. One should not expect too much of the knife, and before using it should examine it carefully. So too, one should always try the tonsillotome before use, to see that

it is sound, and should select from the various sizes and forms that instrument which is best adapted to avoid accidents. Nussbaum described a case where the instrument broke and remained in the tonsil which was still unremoved. The very rare occurrence of an abnormal course of the internal carotid may be omitted, because in such an injury which could not be foreseen surgical aid is generally too late; but I met with one case where directly after removal of adenoid growths I was obliged to proceed to tracheotomy, and after aspiration, long continued artificial respiration through the tracheal opening saved the life of the child.

The prophylactic treatment of peritonsillitis and of retropharyngeal abscess requires an early incision. Wendt showed that delay in opening these abscesses might lead to fatal extension into the thorax. The danger of erosion of larger or smaller vessels should also be considered. I wrote in 1895, "It is a very unpleasant experience to meet with profuse arterial haemorrhage when the incision is made, as has occasionally happened to me with patients seen in a late stage, and I would advise that under the conditions mentioned (that is, great tension, difficult evacuation, deep seat and long duration of the disease), an exploratory puncture should be made. Then we shall at least be able to have ready everything required to stop the haemorrhage." Since then I have had a fatal case through haemorrhage and flooding of the larynx, in consequence of erosion of the carotid. This was in a very weakly child, markedly pale and much run down, who according to the mother's account had refused food for several days, and who had a very tense, fluctuating, and apparently very painful peritonsillar swelling, and a fluctuating swelling under the chin. After the latter had been opened and the contents proved to be pus, the peritonsillar swelling was punctured at its most prominent point with a small scalpel. The result was an enormous arterial haemorrhage. Immediate tracheotomy proved useless. It would have been better in this case—from the operator's point of view—to have explored the swelling first with a very fine needle, because an ordinary large canula

would probably also have caused haemorrhage. We were led to deviate from our own rule in this unfortunate case by the descent of the pus to the swelling in the neck, the purulent contents of which made us assume that the peritonsillar swelling was also purulent. No pulsation was perceptible in it. And though from the clinical aspect, one must not omit to mention that the ultimate spontaneous rupture, which would have been unavoidable, would have led to the same fatal issue if the child had not succumbed to exhaustion, yet the details of this case are instructive in showing us that in such cases we cannot adopt too careful preliminary and preventive measures, especially when we take over the case of a patient whose previous history is not known to to us.

After operations with the galvano-cautery on the nasal mucous membrane, the open treatment is known to be best and treatment by plugging is in general contra-indicated: the wound does best and the healing is most rapid when haemorrhage has been avoided in applying the galvano-cautery.

After all operations on the bones, plugging should be used as a prophylactic. Even after removal of a portion of a turbinate bone, where formerly I tried to do without plugging, I now advise its adoption, except in cases where the patient remains under my immediate observation.

Some recommend that an eschar made by the cautery should cover the wound to act as a prophylactic or as a direct styptic. Liquor ferri perchloridi may be painted over it for this purpose, or a solution of chromic acid or trichloracetic acid, or the hot iron may be employed. The use of such measures is obvious. They are the more important when we have to treat regions where compression cannot be applied, as in the pharynx and larynx. But we must not expect them to be of use in very severe haemorrhage, because under such conditions they are scarcely applicable. In these cases when plugging cannot be resorted to, it becomes necessary to compress or ligature the vessel supplying the part, and in these cases it is best to combine the methods for temporarily and for permanently stopping the

haemorrhage. Even plugging is not a sure method of arresting bleeding and is often used only temporarily when the bleeding point cannot be found. In this respect, a case of Kiesselbach's is very instructive, where the patient died of nasal haemorrhage in spite of plugging; and the patient preferred to die rather than put up with the plugging any longer.

After plugging of the nares, long persistent mental depression or true melancholia may set in for which the loss of blood is probably responsible. I have also drawn attention to the over-filling of the lymphatic channels and of the subarachnoid space which nasal plugging causes, and which possibly may be the cause of cerebral nutritional disturbances. To prevent such consequences, the use of plugging should be as far as possible restricted, both as regards its extent and its duration. It is best, when possible, to apply the plug or compression in such a way that it acts upon the bleeding part only, without interfering with the rest of the nasal cavity. One kind of plug is made in the form of a soft rubber tube with a distal bulb and suitable inlet tube, so that it may be filled with air or with iced water and closed by a tap and so be kept in situ. They have the advantage of being easily refilled or replaced. I have invented and shown such instruments which are easy to use and clean. So too for haemorrhage from the anterior part of the septum, at Kiesselbach's spot, I have devised suitable, self-retaining metal instruments, which compress the bleeding point without obstructing nasal respiration.

The Prevention of the Diseases of the Urinary Organs and of the Male Generative Organs

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The Prevention of the Diseases of the Urinary Organs and of the Male Generative Organs

In the male there is so close a connection between diseases of the urinary apparatus and diseases of the generative organs, that it seems best to consider them together. Diseases of the generative apparatus in the female have already been considered elsewhere; we shall therefore omit them.

A. General Prophylaxis

The general principles of diet and of hygiene are important in the prophylactic treatment of the urinary and sexual organs. Misuse of these organs may be the direct cause of disease of them; for example, sexual excess may cause sexual nervous troubles, and cold may cause nephritis. Diseases of the genito-urinary apparatus may also appear indirectly. It may be secondary to some other disease; for instance, nephritis may occur after diphtheria, or after poisoning with chlorate of potassium. Urogenital tuberculosis may be secondary to tuberculosis in other parts; sexual neurasthenia may be part of a general neurasthenia. It would take us too far from our subject if we were to describe these here. We therefore refer the reader to those sections which deal with these matters.

On the other hand, we shall regard it as part of our work to consider certain changes in the urine and certain general prophylactic measures in disease of the kidneys. In the urine,

we may meet with albumin as an abnormal constituent. In so far as its presence is due to kidney disease, there is nothing to add to what will be said about it later. But slight albuminuria may occur after intense mental emotion, or bodily exertion, or after high feeding, especially with food rich in albumin, and after cold in persons otherwise healthy and still young; this is termed physiological albuminuria. The limits of physiological albuminuria have been considerably reduced during the last few years, for this slight albuminuria is often only the commencement of an insidious disease of the kidneys. These cases therefore deserve very careful watching and treatment; partly because we are justified in assuming that this form of albuminuria owes its origin to injury of the renal epithelium, even if only transient, and partly because it seems possible that when such transient injuries are recurrent they may finally lead to a more serious permanent renal lesion. The observations of J. Müller as to the formation of casts in the urine of cyclists seem especially interesting in this connection. Casts are probably somewhat more significant than mere albuminuria. It would be well to have the urine of all people examined from time to time for albumin and sugar, for examination of the urine would prevent many a renal trouble. Blood in the urine is no less significant than albumin. It is generally a sign of disease of the urinary tract (most often of the kidneys) and is then of less interest and importance than the disease itself (apart, of course, from its symptomatic significance); yet new growths, stones and parasites of the urinary tract may sometimes cause haemorrhage so serious as to threaten life, and haemorrhage is then the chief factor. Prophylaxis of these diseases is at the same time prophylaxis of the haemorrhages. Far more important are those haemorrhages which may arise as the result of diseases of the blood, such as purpura and scurvy, and in haemophilia. They are sometimes the only symptom of the latter disease, and may then be termed renal haemophilia, as Senator suggested. The prophylaxis of these diseases belongs entirely to internal medicine and surgery; we therefore refer the reader to those sections.

Much more numerous are the cases in which instead of unaltered blood we find only the colouring matter of the blood—haemoglobin or methaemoglobin—in the urine; this is haemoglobinuria. Some drugs are very harmful in this respect. Certain poisons are introduced into the body for therapeutic purposes, and whether introduced through the digestive tract, skin, mucous membrane or subcutaneous tissue, they may in large doses disintegrate the red corpuscles in the blood and produce haemoglobinuria and other serious consequences. The greatest care is required in the use of chlorates and of the mineral acids, carbolic acid, napthol, iodine, arsenic, and especially of glycerine and pyrogallol. These should be given as little as possible to children, and not in too great doses to adults. We should first accustom the body to them, and in external applications we should not apply them too extensively and above all not to absorbent parts of the skin. For these reasons, apart from other reasons against all intra-uterine injections in pregnancy and parturition, caution must be observed in using glycerine intra-uterine injections to induce abortion, as has recently been recommended. The value of the internal use of hydrochloric acid, as recommended by Unna, during the application of pyrogallol needs confirmation. This would be like setting the fox to mind the geese. The prophylaxis of haemoglobinuria in burns and in severe infective diseases is the prophylaxis of these diseases. In respect to malaria, some assert, though others are not of the same opinion, that the long continued use of quinine produces the worst type of malaria, "blackwater fever," with haemoglobinuria. Lastly, mention must be made of so-called "paroxysmal haemoglobinuria," in which attacks of haemoglobinuria occur with other characteristic symptoms.

The essential nature of this disease is still unknown, and prophylaxis is therefore limited to forbidding the patient to do that which experience has shown may call forth an attack, especially much walking or being out in the cold, and particularly walking in cold weather. Patients among the higher classes may therefore with advantage be sent to winter in a warmer climate. In this way we can prevent

attacks or at least curtail them. When there is syphilis or malaria present, specific treatment should be used for the disease. One may also try Chvostek's method of giving amyl nitrite at the commencement of the attack. He is of opinion that the condition is caused by spastic contraction of the cutaneous vessels.

Another symptom of many kidney diseases is dropsy, which may develop either as anasarca or as an ascites. Most accept Cohnheim's theory and regard it as due to a transudation through the vessel walls caused by the retention of urinary substances. In the chronic forms hydraemia may be an additional cause. When the heart fails during the course of a nephritis this factor in the causation of oedema must also be considered. The prophylaxis of dropsy is firstly that of the primary trouble. When there is inflammation of the kidneys, drugs given for the nephritis will in favourable cases also act upon the dropsy, and in acute nephritis this will suffice. In chronic cases on the other hand, correct treatment of the dropsy is one of the most important prophylactic measures in the treatment of the chief trouble. One danger which may arise from the dropsy is encroachment upon the space in the large cavities of the body, by which the action of the heart and lungs is interfered with; also oedema of the brain, vocal cords and lungs may directly threaten life; oedema of the mucous membrane of the stomach and intestines may produce digestive disturbances; and oedema of the skin, which when tense may crack and allow of the entrance of pathogenic germs, may thus cause death by erysipelas and gangrene. This danger of sepsis occurs also when operative procedures are undertaken to relieve the excessive tension of the skin. Scarification which opens up many points of entry for germs, cannot therefore be recommended. Even the incisions which Senator does not condemn are far less valuable than capillary drainage in which small hollow needles only are passed through the skin, and the serous fluid runs away through a long elastic tube into a glass vessel containing some antiseptic solution. The skin, the instruments and the hands of the operator must be first disinfected by

the ordinary methods, and the points of puncture covered with salicylic or sterilized wool. For the same reason, a hollow needle should not be left in more than two days. With restless patients it is well to remove the needle at night. After removing the needle antiseptic wool should be bandaged over the wound, because fluid is apt to ooze for some time afterwards. Tapping of the body cavities which contain fluid, and scarification of the oedematous vocal cords, or tracheotomy, which may become necessary, must be carried out by the ordinary rules. In practice tracheotomy is probably better than scarification of the cords. In cases where oedema of the glottis threatens, everything should be ready at hand, so that when the danger occurs there may be no delay. These are the local measures for dropsy; but even when other means are employed to reduce the general oedema, certain precautions must not be omitted. The administration of drugs to cure the thirst is now probably discarded by all, because of the dangers of paralysis of the heart and uraemia. Instead of these, we employ diuretics, diaphoretics and laxatives with good effect. In ordering diuretics none that are drastic must be used; in acute cases, carbonates of the alkalies and salts of the vegetable acids are suitable; or if necessary digitalis and diuretin may be given. In chronic cases other diuretics may be given, such as linseed tea, squills and caffeïn. Calomel is very effectual, but also very untrustworthy; more than fifteen grains in three days must not be given, nor must it be given for any long period. Notthafft had one case, which had been treated elsewhere by calomel, end fatally from mercurial enteritis; and in another case, where he himself administered calomel very cautiously, a severe stomatitis followed.

Diaphoresis can be usefully obtained by warm or very hot baths from 96° F. to 104° F., dry warm packs or moist hot packs, hot-air baths and hot-sand baths. But in using these means the head should be covered with a cool compress to prevent an apoplectic attack, and the method should not be carried to extremes, otherwise the heart may be injured, and moreover by too strong diaphoresis, urinary constituents in the blood may accumulate and cause uraemia. The

internal administration of diaphoretics, such as pilocarpine or the salicilates, is not to be advised, because they are either ineffectual or are cardiac poisons. If we desire to carry away the fluid through the intestines we must, especially in recent cases, beware of purgatives which irritate the kidneys, and should use those which are mildest, such as salines and vegetable purgatives. That all dropsical patients should be confined to bed, or at least be in absolute rest, is self evident.

Uraemia sets in when the kidneys and the skin and the intestines no longer suffice to remove waste products of metabolism from the body. We should then in addition to attempting to restore the action of the kidneys by diuretics, and especially by digitalis, try to excite the vicarious action of the intestines and the skin. Treatment of the nephritis and of the dropsy is thus also a preventive of uraemia. If slight uraemic signs are already present, and especially in chronic cases, we must not delay. However, in promoting the activity of the intestines and skin great care is needed, because too energetic purgation may cause poisonous matters which are difficult to eliminate to accumulate in the blood, and thus produce uraemia instead of preventing it. In the chronic uraemic conditions which may follow certain strictures, diseases of the bladder and surgical kidney, special care is required in any intra-urethral manipulations or an attack may be brought on. Senator recommends as a prophylactic, that the patient's diet should consist largely of milk, or even better, of skim milk because this is poor in the extractives which probably cause the uraemia.

Special mention must be made of venereal disease as a cause of disease of the genito-urinary organs.

Venereal disease is perhaps as old as humanity, and almost equally old are the attempts to prevent it by prophylaxis. Some forms of venereal disease were evidently known to writers of the most ancient times, while syphilis was probably brought over from Japan or India at the commencement of the fifteenth century. Textbooks on syphilis state either that syphilis originated from America, or that it has existed from the most ancient times in the countries around the Mediterranean, Asia Minor and Central Asia. Both

these statements are incorrect. Against the first statement we may cite the fact that the first irrefutable descriptions of syphilis by European writers date from the middle of the fifteenth century, that is before the discovery of America, and that syphilitic bones are found in those American graves which are more recent than the discovery of this continent by Europeans. Against the second hypothesis, we may say that it is contrary to all our experience of epidemic diseases, that a pestilence which had been known from time immemorial, which is epidemic in character, and could spread without limit, and which had by the end of the fifteenth century permeated the whole Western world, could nevertheless suddenly have appeared in such a terribly pestilential form. This occurs only with a disease coming to a people not yet permeated by it. But as syphilis was certainly known in ancient India and Japan, and as just before the appearance of the first sporadic outbreak of syphilis in Europe an active overland intercourse with Asia had developed, it was probably introduced from those countries. The expedition under Charles VIII was then the accidental opportunity for the spread of this pestilence.

Attempts to prevent venereal disease have not been very successful. Blaschko asserts that in Berlin every ninth or tenth person has had syphilis, and Ströhmberg says that twenty-four per cent. of the medical students of the University of Dorpat take home with them not only their doctor's certificate but also syphilis.

The chief source of the spread of venereal disease has long been prostitution; in other words, illegitimate sexual intercourse. It is therefore true that to prevent venereal disease we must first prevent prostitution. Prostitution is thoroughly dealt with in another part of this book, where are considered the ways in which the removal of this danger of prostitution may be effected by doctors and sanitary police. In regard to this battle against prostitution, we shall only consider that aspect which is concerned not in fighting the consequences of the evil, but the evil itself.

In the battle against prostitution many means have been

adopted, but only a small number of these can be recommended. In the first place, all attempts to suppress prostitution by force must be rejected. History shows that all such attempts have been in vain: neither the burning of prostitutes among the Jews, nor the public floggings under the West Goth king Recared and under Charlemagne, nor the public ducking at Toulouse and Bordeaux, nor the confinement for life of the Berlin prostitutes in Spandau, nor branding with hot irons, banishment, and capital punishment under Louis IX of France, nor the severest laws in other countries have been able to extinguish prostitution even for a time. On the other hand, all drastic attempts to suppress it have only caused an increase of secret prostitution, as is shown by the conditions in Italy to-day. From this it does not follow that prostitution is a necessary evil which cannot be exterminated, but in view of the teachings of history it is time to give up these childish attempts to remove by punishment and police regulations a form of social disease which arises from degeneration.

We may conclude from the uncivilized native races of the present day what were the past conditions of the now civilized races. History teaches us that the woman developed the idea of morality more intensely and more rapidly than the man, who thus remained behind her. The esteem which the woman thus gained, the forbearance which love bestowed upon her, worked also for good in the man; from a polygamous condition civilized man passed to the monogamous. But as morality is a late acquirement of civilization it will be the first to be abandoned under evil influences, and it is therefore not at all surprising to see polygamous tendencies arise again in the man, which are to be regarded as the expression of a physiological weakness. The man who, without any higher motives, shuns sexual intercourse is as abnormal a pathological specimen as the virgin woman who seeks intercourse, says Krafft-Ebing. A woman who gives way to vice represents therefore a reversion to an earlier period of time and morality than if a man does so. This somewhat theoretical

idea gains strong confirmation from the descriptions of the characters of mind and body of prostitutes, which we owe to Parent-Duchatelet, Lombroso, Pauline Tarnowskaja and Ströhmberg. The want of veracity among prostitutes, their deceitfulness, ethical and religious dulness, indifference to sexual infection, avarice, violence, craving for pleasure, vanity and ingratitude, their origin from degenerated proletarians and criminals, and above all their sexual obtuseness and more or less complete want of altruistic feelings (love of parents, husband, or child) show them undoubtedly to be degenerate beings. There is this difference between them, that about a half of their number is composed of those who are naturally indolent, while the other half from their close connection with crime and sometimes their own criminal acts prove themselves to be the female counterpart of the male criminals and vagabonds. Both classes are parasites on the social body. The harder the struggle for existence, the more prominent is the parasitic nature of these members. Lombroso and Tarnowskaja draw attention also to the large number of bodily "signs of degeneracy" in prostitutes, which are much more numerous than the signs of degeneracy found in criminal women. We have entered somewhat fully into the natural history of prostitutes, because it shows us clearly what are the causes of prostitution.

These are the demands of the man who has these polygamous tendencies, and the physiological weakness of the prostitute, which represents a degenerate type. Thus prostitution is seen to be a social and biological morbid condition which cannot be exterminated by police regulations and laws, that is by force. The war against prostitution then must not be a war against prostitutes and brothel-keepers, but a war against the demand and the supply. The factors which must first be brought to bear upon it are religion, education and knowledge. As to the value of religious training for the acquisition of moral principles of life, it is superfluous to say anything here. Boys should be taught from their earliest youth that women have equal privileges; because the history of the past

teaches us that with the increase in esteem of the woman, polygamy and prostitution diminish. And the girl should not be brought up as a doll but as a child enjoying life. Many to-day recommend active games, regularly played, as the best means against all that is unnatural. But the growing youth must not be anxiously kept from the knowledge of sexual matters, but should at the right time be taught at school or at home that the instinct which is awaking in him is closely connected with everything great and noble that stirs the human heart and mind, and must not therefore be used for common lust; that the founding of a family, if there are no higher grounds against it, is the duty of the citizen and that the misuse of the sexual instinct is bound up with the greatest dangers to his health. To-day, unfortunately, it is left to the young man himself to procure this knowledge from some (generally an unclean) source. We cannot sufficiently warn against reading the writings of abolitionists. These works which, most of them, present the prostitute only as a victim of social conditions who is to be pitied, as the product of the sexual lust of the man (possibly of the better classes) and thus commit the error of comparing the degenerate prostitute with the respectable woman, are too apt to make the young, inexperienced man look upon the prostitute as an unfortunate, fallen girl who should be pitied; and for this reason, as experience shows, such youths fall most quickly into the hands of prostitutes. But the young man must not only be warned against intercourse with prostitutes in the narrower sense of the word, but against all illegitimate intercourse. It is particularly the ever increasing illicit intercourse in large cities, garrison towns and university towns, which is like a cancerous growth, a festering sore in the moral character of the young. This illicit intercourse which is glorified in the most revolting way by modern dramatists and novel writers, and unfortunately also on the stage and in certain periodicals, has the apparent advantage of protecting young people against infection by prostitutes; in reality such is not the case. Most only take up this illicit intercourse after they have become infected through prosti-

tution; like burnt children they avoid the fire; a very large percentage do become infected by such illicit intercourse, and that a small minority do not become infected does not counter-balance the demoralizing influences which it exercises on both parties to it. The girl who after her first illicit intercourse often enters into a second, a third and so on, becomes certainly only in a few cases a prostitute, if one adopts the definition that prostitution denotes giving up the female body for sexual purposes in return for money, but—if one considers merely the means taken for the prevention of conception—the moral character of the girl is gradually completely ruined. And even if she herself does not become a prostitute, her daughter very probably will. Therefore we were very glad to find some eminent German academic teachers a short time ago giving advice about morality to the youths at the university. They pointed out that sexual abstinence is right for the young and that it is not injurious. One cannot too strongly fight against that banal phrase, "a natural instinct which it is unnatural to fight against." The injury which is done to so many by the illegitimate satisfaction of the sexual instinct is a million times greater than the trouble which a few sexual neurasthenics feel from this abstinence.

Many of those who hear this message of the value of abstinence do not believe it; and there are still more who have never heard the message at all. Here, what private hygiene fails to do, public hygiene must undertake. The blind man needs a guardian if he is not to set fire to others by a lighted torch. If culture and morality do not advance in a straight line but in waves, we are at present as regards morality in a very deep valley. Sometimes, too, by a misuse of art, ideas of the grossest nature are spread by being exhibited in shops, upon the stage, in periodicals, advertisements, literature and paintings. It is certainly necessary that the Government should act more stringently in this matter, undeterred by the outcry of those whose "business" will be curtailed thereby. The only doubt that exists is as to the method to be adopted. The difficulties are not small.

The attempt to accomplish something by legal enactments has failed in the German Empire, and was not, besides, a happy idea. Such legal judgments might have interfered with art (though this danger was not so great as seemed at first, because public opinion would soon have found a remedy), and such enactments moreover cannot be precisely enough drawn up to prevent the culprits from slipping easily through the wide meshes as they have before. The best method perhaps would be to increase the discretionary power of the police, and to let them have the advice of a committee of representatives of art, which could veto any proposed measures that seemed undesirable. To-day, the police aim at restricting registered prostitution as much as possible, and thereby naturally only increase secret prostitution, and thus increase the amount of sexual disease.

But knowledge is also an important factor in the battle against prostitution. The people should, in this respect, be taught more and more about the terrible extent of venereal disease, about the ease with which it may be acquired, about the difficulty of curing it, and its terrible results often for many years after infection. Societies for improving the education of the people would do a great service if they were to take this teaching out of the hands of undesirable writers. Already in several German universities public lectures are given on the prevention of venereal disease, in which it is not recommended that precautionary measures be taken before and after coitus, but in which a description is given of the dangers of sexual diseases and of the infection in prostitutes, and abstinence is advised. The campaign against the abuse of alcohol is our ally, because alcohol is a sexual stimulant, and on the other hand it paralyses the normal inhibition apparatus over which the will presides. The experience of physicians confirms the statement that most infections take place under the influence of alcohol.

The campaign against solicitation is very hopeless in comparison with the struggle against the demand. Wherever there is the demand for it, solicitation will certainly soon appear. Among prostitutes, only about eight per

thousand are prostitutes by chance; that is, girls who were led into prostitution by social circumstances, by misfortune, insufficient pay, or by being led astray. These eight per thousand probably are those who show themselves capable of improvement, while the indolent and active criminal classes are incapable of improvement. Generally, the number of these prostitutes by chance is considerably over-estimated; abolitionists and social democrats especially do much in distorting the facts. Nine hundred and ninety-two per thousand of prostitutes follow their trade because they will not work. It is quite illogical to say that a girl who is in want must be idle if she is to get herself out of want. The difference is simply this, that the normal woman in want starves and strains her powers to the utmost, and would rather die than lead a life of shame; but that the degenerated prostitute does not want to work, and therefore takes up prostitution and only afterwards, as a rule, suffers want. We do not deny the abuses in the under-payment of female workers. The conditions in the Berlin mantle manufactories are well known, and, according to Charles Benoist thousands of workwomen in Paris work day and night to earn 250 to 350 francs a year. To infer more from these figures than that many thousands of women must suffer hunger and starvation from such starvation-wages would be unscientific. He ill understands the woman's heart who believes that she sacrifices her virginity so readily for money; even the second and third illicit connections of such girls are entered into more from vanity, sensuality, and love of pleasure than to earn a livelihood. Nevertheless, we must not be deceived thereby into believing that there exist no callings where the woman would earn nothing if she did not live as a prostitute. Even if the workwoman does not, as so many graphically picture her, sink step by step till she finally goes upon the street, yet such under-payment is a moral harm. For in poverty and misery immorality thrives; and in this mephitic atmosphere prostitution also flourishes.

Being led astray is given as a further occasional cause.

But this is true only in the indirect way just pointed out; the real prostitute becomes one in the circle from which she comes. The stories as to prostitutes being led away are largely false, and in the very narratives which reach the columns of our newspapers, concerning an international trade in girls, it is not as a rule the deception of an innocent girl, but the selling of herself by a prostitute who this time, for a change, sells herself to a foreign purchaser, as she had previously a hundred times sold herself in her own country. Town life has a very significant bearing on this subject. The opportunity it gives of earning more easily and of leading a lazy life unhindered exercises a powerful attraction upon the more worthless individuals in the country. These individuals who in the narrow circle of clearly-defined duties might remain virtuous, there go under. Such an exodus from the country can only be stopped by restricting free emigration; it would be a beneficial regulation, but there is as yet no prospect of it being put into operation.

The excess of men has been named as a cause of prostitution, but does not really exist; and also that men do not marry. The fact is that prostitution flourishes not because many men do not marry, but that many men cannot marry because they are in the hands of prostitutes. In general, the money which is required for the latter and for the bachelor life is together much more than would be required for the expenses of an ordinary household.

With such facts before us, obtained from the unprejudiced enquiry into the origin of prostitution, one feels very sceptical about the possibility of directly reducing solicitation. We can try to rouse the public against immorality, alcohol and syphilis, but we shall not be able to accomplish much. We cannot deprive all criminal parents of the care of their children, and compulsory school education is of little use for degenerate children. We must be content, unfortunately, with helping poor respectable working people to educate their children and save them from intercourse with degenerate individuals. A tax to be levied on unmarried men and paid to girls

who are in need, from fourteen years of age till their marriage, would only be putting a premium on laziness.

In view of the want of success which has followed the endeavours to get rid of prostitution, in view of the poor prospect of soon being able to diminish solicitation and demand, there remains nothing for the Government to do except to control it. The right of the State to register and control prostitutes has indeed been contested by the abolitionists, because it is an encroachment upon personal liberty; but apart from the question whether prostitutes should have the same rights as the rest of the people, prostitutes are certainly a great source of venereal disease, and their indolence as regards these diseases and their unwillingness to be controlled increase this danger, and thus they are absolutely at variance with the good order of a state governed by the principles of altruism. Throughout the state the wishes of the individual must give way to the interests of the whole; and there is no reason why an exception should be made with prostitutes. On the other hand, the objection has been raised that control has been of no use, and statistics are brought forward in proof of this. But nowhere so much as in this subject can the personal bias of the investigator be brought to bear upon statistics, and we agree with Joseph that the statistics are quite unreliable either pro or contra. Ordinary commonsense tells us that by the compulsory detention of prostitutes during the time when they show infectious symptoms, their ability to spread disease is removed, and that compulsory detention must be beneficial. But what form should the control take? This must necessarily be threefold: administrative, medical and penal.

The administrative work must be to find the secret prostitutes and to see that they are registered. The removal of secret prostitution is its most important object. All regulations devised against prostitution are illusory until one makes up one's mind to lay the axe to the root and make secret prostitution impossible. Their number is perhaps ten times as great as the number of registered prostitutes, and their danger is still greater. Most sexual

disease is developed through secret prostitution; the fact that these prostitutes are not treated keeps them longer infectious, and their disease is more harmful both to them and to those whom they infect. We know the number of prostitutes in civilized countries; as prostitution represents a form of social degeneration, their number everywhere must be about the same, and this is according to Russian authorities, about 5·6 per thousand of inhabitants. The administrative authorities have therefore a fairly trustworthy guide for ascertaining if their arrangements are adequate for the discovery and registration of all secret prostitution. At the present day Berlin controls only 1·9 per thousand, and Brussels only ·5 per thousand of its inhabitants, while several Russian towns have reached over 5 per thousand of their inhabitants.

The police arrangements of to-day are sufficient only for the smaller towns under 30,000 inhabitants; in the larger towns they are not adequate for the work to be done. Power should be given to the local authorities of these towns to enable them to control public morality and organize their own detective service. For this purpose they must have a sufficient number of trained and trustworthy officers, who would secure the notification of secret prostitutes, and who would be tactful enough not, on the one hand, to be deceived by an elegant appearance, nor on the other hand, to mistake innocent women and girls. They should have no other police duties; it must be the duty of others to make the arrests. We must also warn against doing what the police have sometimes unwisely done, that is, going so far in their zeal for morality as to put under control girls who carry on illicit intercourse. Thereby one only increases prostitution. The question whether registered houses or separate houses should be allowed is very difficult. In reality, doing away with registered houses would not prevent several girls from living together under one woman, nor would it do away with all prostitution outside these houses. Our advice is like that of Jadassohn and Joseph, to try to work with the two systems combined. The closing of registered houses in large towns has certainly

been followed by the worst results, because it increases secret prostitution.

The second factor, the medical, has to do with the examination of prostitutes, independent of, but in sympathy with and supported by the administrative authorities. The examinations should be frequent, at least twice a week, and made where possible by specially trained physicians, and should not be limited to the external genitals, but extend to all parts of the body which may show signs of disease. Opinions as to the value to be attached to examination for gonococci vary very much. Neisser regards it as necessary, and this opinion is held by many eminent physicians and gynaecologists; others, as Behrend, regard it as superfluous. Certainly, if such examination is to become general, medical resources will have to be considerably increased. We shall probably not be wrong if we assume that every prostitute, whether we find the gonococcus or not, has had gonorrhœa. Medical control should be free from all police accessories; it should be of the nature of a medical consultation. Therefore we should only examine the prostitutes one by one. We should not treat them roughly, nor keep them waiting unnecessarily. For the same reason the examinations should not be made at police stations, but special stations should be provided in the various districts of each town. The best for this purpose would be hospitals which are fitted out with the necessary scientific appliances. In these hospitals it is possible also to carry out the treatment of syphilis, according to Fournier, for two or three years, the value of which, as regards prostitution alone, will probably not be denied by any physician versed in the subject. From these hospitals the prostitute could at any time be transferred to a hospital for compulsory treatment. The wards set apart in hospitals for diseased prostitutes need to be considerably enlarged. The cost of these arrangements must be borne by the State and community. The proposal made by a few, to institute a fund into which prostitutes should pay, and which would act beneficially because it would in part cover the expenses of examination and treatment, and give to the examination

more the nature of a medical consultation, has however the disadvantage that it would place prostitutes on a par with workpeople, and thus make prostitution recognized as a trade, and would signify at least the indirect payment of doctors by prostitutes, and this must be avoided. For the purpose of this control and regular examination, cards must be arranged for prostitutes, which bear the photograph of the prostitute, name, age, day and year of registration, date of previous infections, statement of treatment undergone, and dates of inspection. These cards should, on any change of residence, be sent by the authorities to the doctor in the district of the new place of abode, so that he may easily have a history of the case. But the cards of prostitutes, which tend, through the inadequate examinations at present made, to deceive the public as to the greatness of the danger, and which have been used to deceive by prostitutes themselves, should always have the photograph of the prostitute, and state the sexual diseases from which she has suffered. Many a man might, on reading the word "Syphilis," even though followed by the word "Cured," hesitate, and consider the matter once more.

The third factor, the penal, arises when prostitutes disregard the regulations, and is called for both by the administrative and the medical side.

In this way, one can and must succeed in efficiently controlling prostitution and reducing sexual disease. But a necessary condition is that there must be no penal paragraphs in the law, which would make one who gives a lodging to a prostitute be regarded as a procuror. It is certainly somewhat hard against the woman that the man who is suffering from venereal disease cannot also be medically controlled by the State during treatment. Apart from the fact that most women affected with venereal disease are not controlled, all proposals for any special laws about syphilis have proved to be utopian. It cannot be carried out unless the doctor who has been consulted in confidence, notifies the syphilis to the appointed medical authorities. The result would be that patients would no longer go to doctors, but to quacks, and that

sexual disease would still further spread. We should first at least have to put an end to quackery—a hope which at present has no prospect of fulfilment. This much, however, might in the present day be demanded; that before marrying, both parties, or at least the man, should be examined to see whether he is sexually healthy. Meanwhile we must endeavour to explain to men the dangers of prostitution and the nature of sexual disease, and try to raise their sense of duty towards their fellow-beings. Only in the army and navy, and perhaps also in factories, can one undertake regular periodical examinations. In the army and in the navy, we must insist that the soldier or sailor does not leave the barracks or go on shore while he is ill. Certainly, from our experience, we can say, that these military examinations are evidently not made thoroughly enough, or that they are evaded. At the present day a very considerable number of soldiers are being treated outside the barracks. The introduction of examination in factories, to which the workmen would mostly raise no objection, would be very beneficial. One of us had an opportunity of seeing three extra-genital hard chancres in unmarried workwomen, which had been produced by the kiss of a syphilitic workman. The public has very little or no idea that there is danger of infection in the use of cups and glasses with broken rims in restaurants, and in the common use of wind instruments, blowpipes, tobacco pipes, and vessels for eating and drinking. In connection with the common use of drinking vessels in various religious ceremonies, the introduction of the American fashion may be recommended, where each worshipper brings his own vessel with him. As regards doctors themselves, we can only urge the greatest caution when they examine syphilitic patients, when selecting one from whom to remove the skin for transplantation on to another case, and in the selection of a wet nurse. Vaccination-syphilis has been done away with since the introduction of animal lymph, and the importance of the use of aseptic instruments is self-evident to the modern surgeon. For men and women of the lower class there should be the possibility of

treatment free of charge, by the establishment of sufficient hospitals in the large towns, where advice and medicine can be had free. These should, when possible, be open also during the evening, in order that workpeople may not have to give up their working hours and thus lose their wages. In these the people should be treated with the same amount of respect and regard for their feelings as in practice among the better classes. But they must be particularly told (and this applies to the better class of patients too) of the infective nature of their disease, of the duration of the infection, of the various ways in which infection may be conveyed, of the absolute need of living an abstinent life for a few years, and of being treated sufficiently long, and of not entering into marriage without first obtaining medical permission. The method adopted in some hospitals of giving printed rules to the patient does not seem to us advisable, because experience has shown us that these papers pass from one workman to another, and lead to self treatment without medical advice.

The general prophylaxis of sexual disease has been first mentioned because the most numerous diseases of the urinary and genital apparatus will thereby be prevented; but very great importance must also be laid upon another misuse of the genitals—we mean onanism. How far this may produce disease will be discussed in the special part. We understand by onanism artificial sensual stimulation of the genitals, produced by any manipulation whatever, but without the opposite sex. This vice is more common to-day than ever before, and is as a rule taught to children at the beginning of puberty by companions of the same age or older. There are schools and boarding schools where there is scarcely one scholar who does not indulge in this vice. In girls' schools such malpractices are, contrary to the current opinion, rare, and this corresponds with the fact that the normal woman does not feel the sexual impulse until cohabitation has taken place; previously it has only expressed itself in a vague longing for love, marriage and maternal happiness. With the growing knowledge of the evil of their immorality and also on account of their

marriage, most men give up this vice; but there are also men, who in spite of marriage or illicit intercourse, cannot give up this habit of their youth and practise it till their old age. The injury done by onanism is greatly exaggerated, especially in popular pamphlets, nevertheless we cannot regard it lightly. Apart from the tolerance of it, which differs in different individuals, one has also to consider the age at which the habit was commenced and the intensity with which it has been practised. The younger the individual, the more likely it is that permanent injury will develop. Moderate onanism in the grown man will be as little harmful as moderate sexual intercourse. We should bear in mind that onanists suffer also especially from so-called mental onanism, which is an artificial production and depicting of sensual ideas which are very apt to produce sexual neurasthenic disease, often bordering on the region of mental disease. If we put on one side the comparatively small number of cases where the patient is cured by the removal of vesical calculi, of phimosis with balanitis, of thread worms and other rectal or urogenital affections which can set up constant irritation, or by the method sometimes successful of a painful operation on the genitals, there remain then only general measures for the prevention of onanism.

"To find ways and means of preventing the pernicious vice of masturbation, especially of 'mental onanism,' is the first duty of teachers and is unquestionably one of the most important problems in the education of the young. Unceasing strict watching at the least suspicion, even during the night and in attending to the calls of nature, together with punishments, sometimes even corporal punishment" (blows on the nates should be avoided because they tend to cause erection), "in childhood and boyhood, and later a careful explanation of the pernicious consequences of the bad habit, will be the most effectual prophylaxis. Upon the whole, instruction and warnings given by doctors are more thought of and have a more lasting effect than lectures by parents, teachers and friends. Where the power of habit is stronger than the best of wills

much may sometimes be accomplished by putting the patient into entirely different mental as well as physical surroundings. Removing the patient from doubtful companions, and from harmful books, inspiring a desire for higher ideas, travelling and living in the country with constant hard bodily work have permanently cured many an inveterate onanist who under the influence of the old conditions strove in vain against impure thoughts and the temptation to commit the act" (Fürbringer.) The modern school with the many subjects to be learned which obliges the scholar to sit for long periods at hard work, and the more luxurious life of towns to-day, which the folly of parents allows the children to share, also favour this vice. The active games mentioned above and gymnastics are excellent against onanism, because they not only supply the lacking exercise, but leave the child no time for impure thoughts. One of the most powerful stimuli, if we omit direct leading astray, is to be found in shops. Look only at the objects displayed in certain drug and stationers' shops, book shops and so-called art shops, and see how eagerly the young gaze on the nudities and obscenities there displayed. One must bear in mind too that such sights affect the child's mind differently from the adult's. Parents have a right to see their children protected from such daily temptation. It is high time that the police authorities should proceed as rigorously as possible against the owners of such shops, undeterred by the outcry of those whose business and profit will be injured when matters become a little more respectable. Onanists who are not too far advanced are often most quickly cured by marriage; but to tie a decrepit old onanist to a healthy young woman is naturally wrong, and to advise an onanist to have illegitimate intercourse is a crime.

Compared with masturbation, other sexual vices are of far less importance. For the danger of masturbation in comparison with coitus is that the former needs no erection, that it is commenced earlier, and from the nature of the case is more intensely practised than coitus. Moreover, we need not consider the consequences of very oft repeated

sexual intercourse as so very harmful, and upon the whole, it may be said that as certain conditions must be fulfilled for coitus, nature no longer fulfils these conditions when the sexual apparatus is strained beyond its functional capacity, and thus makes overstrain impossible. Trivial, temporary injurious effects are certainly not rare as the result of too frequent coitus; but much greater significance must be attached to coitus interruptus than to too frequent cohabitation, and it is one of the commonest causes of certain nervous diseases of the bladder and sexual apparatus.

Lastly, a few words must be added about the use of instruments. When an instrument is to be passed into the bladder, it must be first made as clean as would be necessary were it to be applied to a wound. With the urinary passages the matter becomes somewhat more complicated because the male urethra cannot, as examinations have shown us, be made free from germs by any of the means available. After use, every instrument should be mechanically cleansed with soap, best with soft soap or an alcoholic solution of soap. Catheters and the tubes of irrigation cystoscopes should be syringed out with an antiseptic solution. After the soap is removed by a stream of water, the instruments may then be put into disinfectants, metallic instruments into carbolic acid or lysol, rubber and gum elastic instruments into a solution of corrosive sublimate. Next we sterilize all our instruments in steam which does not spoil rubber articles though they would be destroyed by boiling. Only a few instruments, such as the cystoscope, Kollmann's electrolytic sound and Dommer's faradization catheter cannot be steamed. The cleansed aseptic cystoscope should be kept in the cases introduced by Kollmann, which contain a tablet of formaline and thus keep the instrument permanently disinfected. Other metallic instruments are best kept in well stoppered glass vessels filled with absolute alcohol. For sterilizing catheters with steam, special sterilizers in which the catheter can be suspended so as to allow the steam to pass through it, are very useful but not absolutely necessary. Before introducing the instrument which has been taken from its aseptic receptacle or has been first

made aseptic by placing it for a quarter of an hour in a solution of corrosive sublimate or carbolic acid, the glans penis must be carefully cleansed. If the instrument is to be passed through the posterior part of the urethra, it is well when there is disease of the anterior part to wash out the latter first. In introducing an instrument into the posterior part of the urethra and bladder it is always best to wash out subsequently with a solution of boracic acid.

When there is a tendency to haemorrhage in the urinary passages, it is well if possible to delay passing any instrument until this tendency has subsided; in the same way acute irritative conditions, such as cystitis, are often a contra-indication to instruments, such as the cystoscope. In infective disease of the urethra it is obvious that no instrument must be passed into the posterior urethra unless urgently required, and that all operations on the posterior urethra must be performed with the greatest caution. We cannot here go into further details about the technique of instrumental treatment, because it is assumed that this is already known.

B. Special Prophylaxis

I. The Prophylaxis of Diseases of the Penis (excluding the Urethra)

PHIMOSIS AND PARAPHIMOSIS

Phimosis is sometimes the persistence of a normal condition in childhood, where there is not only a narrowing of the preputial orifice but adhesions between the prepuce and surface of the glans penis are also present. The separation of these adhesions takes place between the eighth and thirteenth years of life. Prophylaxis is obviously powerless to prevent this congenital malformation. On the other hand, the treatment of such a phimosis is prophylactic against other diseases. The phimotic preputial folds in which smegma praeputii collects and decomposes are apt to be the seat of obstinate balanoposthitis, they favour the

development of warts, preputial calculi and carcimona of the penis. In severe cases they may hinder micturition and give rise to urinary obstruction and retention; they may also render coitus impossible because it becomes painful and erection inadequate; they favour the development of onanism through the constant irritation of the balanoposthitis. They predispose to urethral spasm and venereal infection especially with the virus of soft chancres. They may make it very difficult to treat venereal disease when it exists. We cannot give injections or use the endoscope with such a phimosis; soft and hard chancres on the glans and inner surface of the prepuce are scarcely within reach for treatment; gonorrhoea becomes complicated by severe balanoposthitis. Moreover gonorrhoea and primary syphilitic sore increase the phimosis because "inflammatory" phimosis is superimposed upon that already present. "Inflammatory" phimosis may sometimes appear in these diseases though the foreskin is not abnormally narrow. The best preventive of these sequelae is removal of the phimosis. For slight degrees of phimosis when there is no imminent danger, we may attempt to stretch the preputial orifice, for which purpose one of the dilatators introduced by Nélaton and Unna may be used. As a rule, however, operation is required. In only a few cases, can we recommend cutting away of a phimotic prepuce which is too long. As a rule, splitting it along the dorsal medium line, followed by circumcision, is best. The dorsal incision alone leaves two ugly ends hanging down like an apron, often oedematous and easily infected. The general introduction of prophylactic circumcision may be advisable from the medical point of view, but is probably an altogether impracticable suggestion. On the other hand, ritual circumcision when performed should be done by a surgeon and according to modern surgical principles, to prevent infection of the child with syphilis or conversely, the child infecting the operator, especially because of the disgusting sucking of the wound by the rabbi. Tuberculosis also and other infective diseases of wounds may be communicated in the same manner. In incising along the dorsum we must first make sure

that there are no extensive fibrous adhesions between the glans and prepuce; these naturally make this operation impossible. Morever care must be taken not to injure the urethra, especially by the scissors slipping into the urethra by mistake.

When a narrow prepuce is drawn back behind the glans, paraphimosis results, the prepuce cannot again be brought over the glans, and both prepuce and glans become very oedematous. Paraphimosis is especially apt to arise out of inflammatory phimosis. The prophylaxis of these affections is treatment of the phimosis, proper treatment and prophylaxis of venereal disease, and prophylaxis of onanism which often is a direct cause of it.

The male genitals may also be affected by almost any skin disease. There is nothing special about these and we refer the reader to the section on skin diseases.

ECZEMA

Eczema of the genitals may appear in the acute or chronic form and affect the body of the penis, scrotum, scroto-crural fold and neighbouring abdominal and femoral regions; while true eczema of the glans or prepuce is extremely rare compared with balanaposthitis which is so common. Prophylaxis consists in the avoidance of certain forms of irritation which experience has taught may produce eczema. First, we must mention the irritation produced by parasites on the skin, by intestinal parasites, by diabetes mellitus, haemorrhoids and the constant action of certain irritants, such as paraffin, turpentine vapour and soot. But the irritation and eczema may persist long after the cause is removed, and direct treatment is therefore required. A further avoidable cause is the accumulation of decomposed substances on the skin, such as perspiration, sebum, and urine. Singly or in combination, they are apt to give rise to intertrigo, especially in small children and fat people, and this may be prevented by keeping the genital regions clean, by washing daily with a mild soap and whenever the parts become wetted with urine, and afterwards dusting with some inert powder. This is more

difficult whenever the parts are constantly wet with urine, as in congenital malformations (*Ectopia vesicae*), urinary fistulae and in incontinence of urine. In these cases when the primary disease cannot be removed, receptacles for the urine should be used. The parts wetted with urine should be washed with a mild soap; instead of powder some protective ointment should be used, one which contains lanolin, and the addition of a mild disinfectant, such as salicylic acid, benzoic acid or boracic acid is best.

BALANITIS AND BALANOPOSTHITIS

Inflammation of the glans and of the inner surface of the prepuce is produced by accumulation of decomposing matter in the preputial sac, generally smegma praeputii, epidermal débris and the secretion of Tyson's glands. The accumulation may be caused in several ways, but uncleanliness is the chief. When there is sexual anaesthesia or sexual inactivity for any reason, and where the mechanical cleansing by coitus fails, enormous quantities of smegma praeputii may sometimes be seen. These cases are easily cured by washing regularly with soap and water. But foreign bodies, preputial calculi, tumours such as venereal warts may also cause decomposition, and it can be cured by removing them. With venereal warts there is a tendency to recurrence, and any existing gonorrhoea should be thoroughly treated. Conversely warts may arise as the result of long standing balanitis. These conditions are much favoured by a prepuce which is both long and narrowed. Circumcision is therefore excellent in these cases. In very long prepuces the anterior part of the prepuce should be removed; dorsal incision and splitting of the inner layer of prepuce do not suffice. The general introduction of ritual circumcision, as has been proposed by some, is out of the question. Those who have been circumcised hardly ever come for medical advice for balanoposthitis. Diseases of these parts accompanied by hyperaemia and hypersecretion of the prepuce, which are produced by bacteria or which favour the invasion by bacteria, such as gonorrhoea, soft and hard chancres, are

very apt to produce balanoposthitis, which may become serious through swelling of the prepuce and the development of inflammatory phimosis. They may be prevented by cleaning the preputial sac from inflammatory secretions, or if there is phimosis by the injection of mild disinfectants between the glans and prepuce by means of a syringe, or by operating to cure the phimosis.

Sexual excess does not readily give rise to balanoposthitis and onanism never causes it. Lastly, there are men who have a special predisposition to balanoposthitis, who regularly get a fresh attack of their trouble after every coitus, after a walk in warm weather, after any slight mechanical irritation or an exacerbation of decomposition.

We must also mention patients with diabetes, in whom these organs when wetted with urine afford an excellent nutritive medium for bacteria. In these cases the greatest cleanliness is required as a prophylactic ; the parts should be washed daily and sprinkled with powder; but in some cases where there is great sensitiveness to irritation, washing must not be overdone ; these cases of balanitis are closely allied to eczema, and often they will not permit of the use of water and must be powdered over daily after the old powder has been removed. We have seen cases where only a little powdered talc was tolerated without any addition of salicylic acid or starch or zinc oxide, or even dermatol. These patients have sometimes a very liquid smegma which Finger has found to be very irritating. In these cases desiccating powders are best.

HERPES PROGENITALIS

As a prophylactic against this genital affection onanism should be forbidden when it is the exciting cause. There is no object in forbidding coitus. As the trouble depends upon a greater irritability of the nerves, it follows that at an age when strong stimuli affect these regions there is not much to be done as a prophylactic. These affections require very careful treatment not only because, like all wounds, they may afford an occasion for the entry of the ordinary infective diseases of wounds, but more especially

because they make it easier for syphilitic and venereal poisons to enter, and unmarried patients should therefore be told of the great danger to which they expose themselves by impure coitus before these wounds have firmly healed. This statement is the more important because these affections stimulate sexual feeling.

PRIMARY SYPHILITIC CHANCRES AND SOFT SORES

In the general part the measures were given which the individual and the State should carry out to prevent the spread of venereal disease. For the prevention of specific infection of the genitals we need merely mention the necessity for sexual abstinence by the unmarried and the harmlessness of sexual abstinence, and also that venereal infection may not only be conveyed by regulated prostitution but even more so apart from it. The best prophylactic against all sexual infection is naturally the avoidance of all impure coitus. But as we must take men as they are, we must be able as doctors to help them too when they ask us how with least danger to themselves they can have such sexual intercourse. In reply to this question we advise the use of condoms or the penis may be smeared before coitus with some boracic ointment. Subsequent washing with soap removes the infective material with the ointment. This use of ointment is useless against gonorrhoea. There is no greater value in subsequent disinfection than there is in an ordinary washing with soap.

PERIURETHRITIS, CAVERNITIS, URINARY EXTRAVASATION, URINARY ABSCESS, GANGRENE AND CELLULITIS

With the exception of the few cases which are caused by external injuries, these originate exclusively in affections of the urethra and prostate. We refer the reader to what has been said in the general part on catheterism and the passing of bougies, and to the chapters on "Gonorrhoea," "Prostatitis," and "Stricture."

NEW GROWTHS OF THE PENIS

The commonest form of new growths of the penis is the venereal wart on the glans and prepuce. They are as a rule either the result of balanoposthitis and to cure these conditions by operation for the phimosis or by removal of preputial calculi is of prophylactic value, or they have been caused—and this is true of the majority of cases —by long persisting gonorrhoea. The prophylaxis and treatment of gonorrhoea is therefore at the same time the best prophylaxis of the warts and is indispensable to their cure. Sometimes these growths cause lymphangitis and even superficial ulcers of the prepuce; in other cases when they have existed long, they predispose to cancer of the penis. In removing them we have to remember their tendency to recur. Whichever method of operation is selected (whether knife, scissors, sharp spoon, Paquelin cautery or electric snare) care must be taken that the base of the tumour is well cauterized by heat or caustics, such as liquor ferri perchloridi. Very small warts may disappear when the preputial sac is kept dry by some inert powder or when cauterized with powdered savin. Prophylaxis may also be employed for another new growth, carcinoma. The necessity of removing warts has already been mentioned; and it is equally important to remove cutaneous horns. But phimosis and the irritative conditions caused by it are generally concerned in the aetiology of carcinoma. Demarquay states that in fifty-nine cases of carcinoma of the penis forty-two were associated with phimosis, and Travers states that circumcised Jews never or only exceptionally suffer from carcimona of the penis.

II. The Prophylaxis of Diseases of the Urethra

Urethritis

1. GONORRHOEAL URETHRITIS

Among inflammations of the urethra gonorrhoea occupies the chief place. It is the most widespread infective disease of early manhood. It is more insidious than syphilis because, even more than is the case with syphilis, it heals only superficially, and the patient is troubled and threatened with it again for years afterwards, and because the patient remains infectious longer than with syphilis. The necessity referred to in the general part of spreading a knowledge of venereal disease and its consequences among the people is especially obvious in the case of gonorrhoea. With regard to the general prophylaxis of gonorrhoea reference should be made to the statements in the general part about the prophylaxis of venereal disease; and for special prophylaxis to the chapter on "Primary Syphilitic Affections and Venereal Ulcers." To protect against gonorrhoea too the condom is the only serviceable means. All dropping and syringing apparatus recommended by Neisser, Frank and others, and very well planned, afford protection against gonorrhoea only, and not at the same time against the infection of syphilis and soft sores. Obviously, neither method enables the patient to dispense with washing the parts and more especially the prepuce with soap and water. For no other disease of the urogenital apparatus can we speak so readily about a "prophylaxis by treatment," as we can in the case of gonorrhoea. In one case, treatment enables us to prevent the individual from infecting others; in another case, to prevent the development of chronic gleet or the development of complications and serious sequelae. There is even to-day a diversity of opinion as to the treatment to be adopted in gonorrhoea. And yet an agreement between the contending methods is quite within the range of possibility.

Gonorrhoea is an infectious process produced by a special microbe, and its course in the infected human being follows

the laws of many infective diseases. There is no immunity against the disease even if we exclude those cases mentioned by some in which a second more serious gonorrhoea has been acquired after a first gonorrhoea had been cured. We must bear in mind too that the gonococcus has become firmly lodged in the epithelium a few hours after it has reached the urethra, that one to two days after infection it may be found deeply placed even below the epithelium, and that it at once infects the various glands of the urethra. Our bacteriological knowledge of to-day requires us when treating any infectious disease to use either a preparation which directly kills the parasites, as quinine in malaria, or which gives the body time and opportunity to overcome the parasite, for instance antitoxin in diphtheria. In the treatment of gonorrhoea both principles have been applied. A number of preparations have been recommended which have this property in common, that they kill the bacteria; but the bactericidal property of these varies greatly. Among the weaker substances are zinc sulphocarbolate, thallin sulphate, boracic acid and potassium permanganate; among the stronger, corrosive sublimate, resorcin and the salts of silver. The latter, more especially the silver salts, have been extensively used of late years. Some have ascribed remarkably valuable properties to salts of silver, especially to protargol, while others have denied their value just as energetically. It seems to us that the organic salts of silver, more especially perhaps protargol, are very useful because they very quickly reduce the number of gonococci and make them less virulent; but we cannot believe in the mysterious "deep effect" of protargol. No solution of a drug of a strength which can be used penetrates deeply enough to kill bacteria which are situated in the subepithelial layers. Either the substance is not absorbed or but very slightly, and kills no gonococci, or else it is extensively absorbed and will then destroy the cells of the tissue in and between which the gonococci dwell. But probably no fluid injection penetrates into the infected glands. The only remaining alternative logically is some selective deep action of protargol, and if we cannot accept this we are obliged to give up any theory

to explain the action of silver salts; presumably however it is bactericidal.

In the early stage of gonorrhoea, injections with bactericidal substances are permissible only because they in no way prevent nature's efforts at healing. The result of the invasion of the deeper layers of the epithelium by gonococci is an enormous leucocytosis from the vessels of the subepithelial layer towards the free surface of the mucous membrane, and the object of this leucocytosis is to eliminate the gonococci directly or after they have been weakened or destroyed by the fluids of the cell. To prescribe astringents such as zinc sulphate at this stage is therefore a fundamental error, because it checks the salutary leucocytosis. That antiseptic is best at this stage which is least astringent. Proceeding from this standpoint many physicians do not allow their patients to syringe during the first few weeks when there is thick purulent secretion and subjective symptoms, and certainly without any bad results. By about the third week, a time when the subjective symptoms have mostly disappeared, and the secretion begins to be more mucous, an important process has taken place inside the urethra; those parts of the urethra which were covered with cylindrical epithelium have under the influence of the inflammation become covered with pavement epithelium. With this the best soil for the growth of the gonococcus has gone, and it now thrives but poorly upon the surface of the mucous membrane. Astringents may now be used because there are no more gonococci in the deeper parts to be eliminated by the leucocytes, and those astringents are best which at the same time kill the gonococci; the most useful solution for this purpose is one of silver nitrate of the strength of 1 in 3,000 to 1 in 1,000. The nearer the disease approaches its last stages the less the significance of the gonococcus in the catarrh, the more suitable are the astringents such as potassium permanganate, ichthyol and copper.

The longer the acute process is prolonged, and the more it is neglected, the greater are the chances that the migration from the vessels, the tendency to new growth of the connective tissue, and the proliferation of the epithelium will

become permanent; thus arise those cases of inflammatory hyperplastic tissue which by retrogressive changes lead gradually to disappearance of the vessels and sclerosis of the connective tissue, that is to scar formation. What is termed "chronic gonorrhoea" or "gleet" is clinically sometimes a simple catarrh, sometimes a severe organic stricture. These are, as Oberländer and Nilsen have shown, identical pathologically and anatomically, the difference is only one of degree. Our chief modern remedy for chronic infiltration is massage. What this does for muscles, ligaments and joints and for other organs infiltrated with inflammatory products, it can do too for chronic infiltration of the urethral mucous membrane. For every case of gonorrhoea which has passed the acute stage, massage, that is stretching of the infiltrated mass, is indicated. This is done by taking a number of sounds of various sizes and passing them into the urethra at intervals of several days. A supply of straight and curved sounds is needed, and the surgeon may with advantage use the dilating instruments designed by Oberländer, Kollmann and others.

We cannot here enter into the question of the method in which they should be used. Full descriptions of these are given by Oberländer, by Wossidlo, and by Dommer. We need only say that all dilating apparatus should stretch the parts gradually, not abruptly, and that the intervals between applications must be considerably longer than is necessary when simple sounds are used; further, that we can combine dilatation with irrigation (irrigating dilators), that in addition to and in the intervals between dilating, treatment by injections and irrigation is required with solutions, which act sometimes as antiseptics, sometimes as astringents, sometimes only mechanically removing mucus, pus and secretions. The field for mechanical dilatation treatment of gonorrhoea is in conditions where there is much infiltration; here it is the chief remedy. Infiltration and disease of the glands cannot be removed by any chemical preparation, at least not so quickly, completely and certainly.

It is for chronic gonorrhoeal cases that the endoscope is useful; when used by skilled hands it enables us better

than does any bougie or sound to detect local changes in the bladder and to observe the course of disease and whether it is healing. Moreover it is only possible with endoscopic illumination to incise or remove inflamed urethral glands; experience shows and theoretical considerations bear it out that the gonorrhoeal process is often most intense in these glands. It is absolutely essential therefore at the present time that every surgeon who treats disease of these organs should possess a urethroscope, and be familiar both with its use and with the interpretation of the appearances which it reveals. The best instrument is the Nitze-Oberländer; no other instrument is able to give such an effective illumination.

It is not our duty to describe the treatment of gonorrhoea exhaustively. We have only stated the guiding principles of the treatment to be adopted. Treatment by the methods indicated is the best prophylaxis against the development of chronic gonorrhoea of the anterior and posterior urethra, of stricture and of certain nervous diseases.

In the treatment of acute gonorrhoea we must also apply prophylactic measures for the prevention of complications. Such complications are posterior urethritis, cystitis, prostatites, cowperitis, spermatocystitis, deferentitis, epididymitis, paraurethritis, periurethritis, and further pyelitis, secondary nephritis, gonorrhoeal rheumatism, gonorrhoeal conjunctivitis and proctitis, endocarditis, and pyaemia. Prophylaxis of these consists in observing various hygienic and dietetic rules, which the physician should never omit to give to the patient. The patient with gonorrhoea must (1) avoid everything which would unnecessarily irritate the urinary passages. Among these are highly-spiced dishes, alcohol in every form, and sexual excitement. In the second stage of acute gonorrhoea, when in the normal course gonococci only grow upon the free surface of the pavement epithelium, irritating urine may produce fissures and rents in the epithelium, through which the gonococci can then again penetrate to the deeper parts. (2) The diseased urethra must be given as much rest as possible. For this reason treatment in bed is best for gonorrhoea,

but is unfortunately not often practicable. The patient must at least be forbidden all movements which would enable the pus to pass more easily into the posterior urethra, such as walking, driving, and dancing, and coitus. The patient should also be taught how to use the syringe, which should not be too large. Every patient with gonorrhoea should wear a well-fitting suspensory bandage which will not drag on the scrotum; this will diminish the danger of deferentitis and epididymitis. (3) The greatest cleanliness must be observed to prevent the patient from further infecting himself. For this reason a piece of wool should be placed in front of the orifice of the glans; it may be sewn into a bag in front of the suspensory bandage. The soiled wool should be burnt, the genital regions washed daily in a bath with soap, the hands washed with soap every time after touching the genitals, or with an alcoholic solution of soap, In this way it is generally possible to avoid the complications mentioned above. All complications cannot be avoided in this way; for most there is no absolute guarantee. But with due precaution many may be prevented. The treatment of complications belongs to therapeutics. We will merely here state that if periurethral or follicular inflammation develops, all local treatment for gonorrhoea must be discontinued, and the inflammation treated by rest, by raising the parts, by diet, and counter-irritants applied to the perineum; but if the process tends to the formation of an abscess, the abscess must be incised early to permit of the escape of the pus. In this way urinary abscess, extravasation of urine, cellulitis, and fistula are best prevented. In cowperitis the abscess should be incised as soon as it has formed, and one should not wait till there is fluctuation, because this is very difficult to obtain through the fasciae, and time is thereby allowed for extensive abscesses to develop.

When may treatment for gonorrhoea be discontinued? Not when there is no longer any discharge and subjective symptoms have disappeared; not even when

repeated examinations no longer reveal gonococci; but when the infectious catarrh is over, when it is completely healed. In this respect the same pathological, anatomical and clinical rules hold good for this, as for every other infectious disease of any organ. Sooner or later the body will eliminate the dead parasites. Only in inaccessible places where, in consequence of special organic conditions, the natural powers cannot accomplish this, can the infective material be longer concealed. Generally however the catarrh loses its specific characters long before it finally disappears. The microbes of mixed infection survive the specific organism, and the organic changes in the epithelium, the glands and subepithelial structures may remain and even show tendencies to progress long after all gonococci have disappeared; the patient is not yet well and liable to the dangers of the sequelae. Therefore it is not only necessary that repeated examination should no longer show any gonococci; secretion must have ceased, and the epithelium, glands and subepithelial tissues must have returned again to their normal condition. A complete *restitutio ad integrum* can certainly not always be ensured. As in the case of catarrh of other mucous membranes, so too in gonorrhoea, especially in chronic gonorrhoea, there remains a tendency to a watery secretion, from the epithelium and the glands, and the infiltration of the mucous membrane cannot be removed when fibrous changes are far advanced; we can then only treat the effects of the more recent inflammation, so that, as Oberländer expresses it, a "dead scar" remains. To determine whether cure in the clinical sense has occurred, the endoscope is of invaluable service and cannot be replaced by any amount of skill, or other methods of examination.

2. NON-GONORRHOEAL URETHRITIS

The occurrence of a urethritis which has not been produced by the gonococcus is a fact which the experience of every surgeon confirms. The most different causes—mechanical, chemical and bacterial—may produce urethral inflammation. Among mechanical causes are foreign

bodies put into the urethra by onanists or in play by children, urethral calculi, want of skill in passing the catheter or bougie, rapid dilatation, and the self-retaining catheter. To these belong also those changes in the posterior urethra which are the result of masturbation and especially affect the veru montanum, producing changes with subjective symptoms and objective changes in the urine. Chemical irritation has not only been experimentally proved to be possible, but we see it daily in gonorrhoeal patients who have introduced strong corrosives in solution or in the form of urethral bougies into the urethra. Urethritis caused by bacteria is much more common than is generally assumed, although Bockhardt has only succeeded in one case in infecting a second human urethra with the microbe discovered; the significance of other bacteria which have been found is not certain, and no bacteria are sometimes found in cases of disease which must from their clinical course and history be regarded as infectious. We are of course not here thinking of the "urethritis" which is the result of urethral tuberculosis, venereal sores, herpes and malignant disease of the urethra. Non-gonorrhoeal urethritis, like the gonorrhoeal form, develops as a rule after coitus; only it is not the gonorrhoeal poison, but some unknown poison or poisons which produce the effect. It would seem that the vagina may be infectious, particularly at the time of menstruation. Other cases of infectious urethritis have been caused by catheters and bougies which were not aseptic. The clinical course of these different kinds of urethritis is very different. Those forms of urethritis which are produced by mechanical and chemical causes give rise to a muco-purulent or purulent secretion, lasting a few days. Urethritis which owes its origin to misuse of the genitals assumes a chronic character; and infectious urethritis may be progressive, may attack the adnexa as true gonorrhoea does, and take months or more to heal. In cases of gonorrhoea which have been cured, sexual exertions often cause acute exacerbations in which gonococci are not found. But we do not

think the possibility of nongonorrhoeal urethritis must be excluded because the patient has had gonorrhoea; otherwise, the great frequency of gonorrhoea would of itself do away with the diagnosis of non-gonorrhoeal urethritis. For, on the one hand, when there is gonorrhoea, injections and dilatations may cause a urethritis due to the irritation, or a non-gonorrhoeal infective urethritis may develop; on the other hand, the fact that the patient has formerly had gonorrhoea does not exclude non-gonorrhoeal urethritis when the bacterial and clinical examination no longer show any traces of gonorrhoea. The prophylaxis of non-gonorrhoeal urethritis is self-evident after what has been already said. It consists partly in the rules we have already given for the sterilization of instruments, for catheterization, and in the treatment and prophylaxis of gonorrhoea and onanism. Prophylaxis also requires that we should watch over the games of children, and that, as is self-evident, coitus should not occur during the menstrual period. The prophylaxis of urethritis caused by urethral calculi is similar to that for urinary calculi. The treatment of these non-gonorrhoeal forms of urethritis is prophylactically important, because they may be followed by secondary vesical and renal troubles, disease of the adnexa, severe strictures and nervous disease.

STRICTURE OF THE URETHRA

Congenital strictures of the urethra are hardly cases for prophylaxis; they cannot be prevented, and it is only the severer forms, where there is complete atresia, which give rise to conditions which make a prophylactic operation essential. The neurotic, spastic "strictures" will be described in the chapter on "Nervous Diseases of the Genito-Urinary System." Of the acquired strictures, the chief interest attaches to those caused by traumatism and gonorrhoea. Traumatic strictures are mostly the result of injury of the posterior part of the urethra, and should be prevented by properly treating the injury and by the

regular use of bougies for a long time after the wound has healed. Gonorrhoeal strictures, which may be situated at any part of the urethra, occur most often in the anterior part, which is the favourite seat for chronic gonorrhoea, and the best prophylaxis is proper treatment of the gonorrhoea. We would therefore refer the reader to the description of the prophylaxis of gonorrhoea. Certainly, unsuitable treatment of the urethra—for example, the injection of strong corrosives may lead to the development of strictures; but as a rule it is inadequate treatment of gonorrhoea, or, to put it more correctly, neglect of any treatment of chronic gonorrhoea which produces stricture. Histological and endoscopic examination shows that a stricture is nothing more than an excessive degree of infiltration into the mucous membrane produced by the chronic gonorrhoea. The measures adopted to prevent stricture must be such as will cause the exudation to be absorbed and prevent it from being converted into fibrous tissue. Mechanical treatment will accomplish this, and the method devised by Oberländer is the best, in which the endoscope plays an important part in the treatment. We are entirely of the same opinion as Wossidlo, who says: "This (that is, prevention of the small celled infiltration from becoming converted into fibrous tissue) can only be done if the various phases of gonorrhoeal infiltration are carefully watched by means of the urethroscope and treated accordingly. The urethroscope alone renders it possible for us to make a scientific differential diagnosis of the diseased foci and of the stage of their development." The fact is that at the present time in most patients who have been cured of gonorrhoea, strictures of larger or smaller size exist. And it is a fact, too, that these would not be there if treatment by dilatation had been used assisted by the use of the endoscope. Strictures of the severer grades produce a number of secondary diseases. The prophylaxis of the latter consists in the treatment of the strictures. We cannot here go into further details about the method of treatment of strictures. All effectual methods aim at making a passage for the urine through the contracted urethra, and at rendering permanent any dilatation

thus effected; and indeed, when possible, to remove the exudation and restore the urethra to its normal condition, and thus prevent relapses. If the stricture is so firm that it cannot be dilated, a new outlet must be made for the urine. In the treatment of chronic gonorrhoea, dilatation should, if possible, be very gradual; but in very narrow strictures it may be better, when a bougie has been introduced, to leave it in. So, too, in cases where passing a bougie always causes a rise of temperature, or the stricture is so sensitive that no narcotic removes this sensitiveness. In introducing a "permanent" catheter, strict asepsis must be observed. It is best to let the end of the india rubber tube put on to lengthen the catheter pass into a vessel containing a disinfectant. The "permanent" catheter should not pass much beyond the neck of the bladder into its interior, because experience teaches us that "pressure ulcers" in the bladder are apt to form, especially when there is already cystitis. As a rule, it is sufficient to leave it in for twenty-four to thirty-six hours, and if we want to avoid cystitis and pressure ulcers it must in no case be left in longer than two or three days. Urethrotomy must be substituted for treatment by dilatation when the passage through the urethra has to be quickly restored, when the stricture offers too great resistance to dilatation, and when treatment has to be shortened because urethral fever sets in on every occasion. Internal urethrotomy as a rule suffices. External urethrotomy is necessary when the bougie of the urethrotome cannot pass, when there is a traumatic stricture, and when a free outlet must be made for the urine in cystitis, contracted bladder, or nephritis. It is also indicated in a very narrow stricture which is difficult to dilate, when the stricture is complicated with multiple urethral fistulae, urinary infiltration, and false passages, and in complete retention in impermeable stricture. In both operations a catheter must subsequently be inserted and left in, for one or two days in internal urethrotomy and for three to four days in external urethrotomy, to prevent extravasation of urine. But this must be omitted if the patient is very sensitive and the

bladder is diseased, as when there is weakness of its walls, ulceration, or a tendency to haemorrhage. Among complications and sequelae of stricture, prophylaxis is important where there is inflammation and distension of the urethra behind the stricture. In these cases dilatation of the stricture is essential; but when there is inflammation of the stricture, care must be taken lest complete retention of urine sets in. If the inflammation behind the stricture is not removed, abscesses form in the scar tissue and ulcers in the wall with their sequelae: urinary infiltration, urinary abscess, and urinary fistulae. These may be caused too by follicular abscess and injury with the catheter or bougie. Moreover, as the result of these strictures, disease of the bladder (cystitis and irritable bladder), of the ureter (dilatation or ureteritis), of the renal pelvis, calices, and parenchyma (hydronephrosis, pyelitis, and pyelonephritis), and orchitis and epididymitis may appear; and all these might have been prevented by curing the stricture. In treating strictures we should also avoid urethral fever, which must certainly be looked upon as septic in origin. This is best prevented by great gentleness in operating on a urethra with a stricture, by using sterilized instruments and by previously disinfecting the urethra. Other diseases which exist at the same time in the urinary system should be treated. Patients with renal disease not only bear catheterization badly, but their nephritis is increased and urethral fever runs a more severe course, because the defective kidneys do not so well eliminate the products of the fever. For the dilatation of strictures in patients with renal disease, we would therefore select that method which acts most quickly. The prophylaxis of urinary fever after urethrotomy requires, as was stated above, that a "permanent" catheter should be inserted. The bowels should be well opened before the operation, the patient should be well covered up to prevent taking cold, and after the operation he should be given a large amount of liquid to dilute the urine.

URINARY FISTULA

The prophylaxis of urinary fistula consists in appropriate treatment of urethral wounds and peri-urethritis; this has already been dealt with in the chapters on "gonorrhoea" and "stricture."

NEW GROWTHS OF THE URETHRA

So far as concerns prophylaxis, warts are alone of interest. What has been already said about the warts of the penis is applicable.

III. The Prophylaxis of Diseases of the Bladder

MALFORMATIONS OF THE BLADDER

Prophylaxis against malformations of the bladder, in the sense of prevention, is of course not possible, or belongs to prophylaxis during pregnancy. When the malformation already exists—and this applies only to ectopia vesicae—surgical interference to close in the bladder or afford some other outlet for the urine is the prophylactic treatment required to prevent eczema, which otherwise is sure to appear, and pyelonephritis, which develops as the result of an ascending infection.

CYSTITIS

If, accepting the modern teaching, we assume that cystitis is always of microbic origin, it is nevertheless certain that the bacilli are in themselves as a rule harmless to the bladder. Purulent processes in the upper urinary passages, a perforating abscess in the vicinity, and infective processes in the prostate and hinder part of the urethra are often well borne for a long time, until some trauma is added, and cystitis then rapidly develops. On the other hand, aseptic trauma by itself will not set up a cystitis, but only a catarrh of the bladder. This is explained by the great power of resistance possessed by the epithelium of the bladder, and the constant physiological evacuation of its contents, which does not so easily permit of the lodgment of microbes. But

when the epithelial continuity has been broken, when some congestive condition has appeared in the bladder or the contractility of the bladder is diminished, then microbes can effect a lodgment and cystitis develops. The prophylaxis of cystitis may therefore follow two lines, namely: avoiding (1) all trauma, and (2) all infections of the urinary passages. Either form of prophylaxis must be the more energetically carried out when the other factor is already present.

1. The traumata which may affect the bladder are of very varied nature, if one does not limit the term within narrow limits surgically. They may be chemical and are then, as a rule, caused by poisons taken into the body and eliminated with the urine. The inflammatory process is then not confined to the bladder but affects other parts of the urinary system, especially the kidneys. If we exclude a few ethereal oils and resins, such as balsam of copaiba and turpentine, we need only consider cantharides taken by the mouth or used as plaster, which in consequence of the increased power of absorption by the injured skin acts so as to produce inflammation in the urinary passages. The sugar in diabetic urine and the urine in chronic nephritis, if at the same time it contains much uric acid, may likewise produce cystitis. The prophylaxis of these forms of disease consists in proper care in avoiding all drugs which irritate the urinary passages, in prophylaxis of the diabetes or of the nephritis, for which reference should be made to those chapters.

Direct mechanical injury to the bladder, if we omit severe bruising and rupture of the bladder walls, which belong to surgery, is more especially caused by catheterization. It is certain that no less stress is to be laid upon the mechanical injury by catheterization than upon the danger which all acknowledge of introducing germs with the catheter. Daily experience teaches us that the catheter may be passed for long periods by a surgeon or by the patient under conditions of doubtful asepsis without doing any mischief, but that cystitis quickly sets in when in a case of retention of urine the catheter is employed by un-

skilled hands. While referring the reader to the general part for the prophylaxis of catheterization, we would advise that for self-catheterization a soft rubber catheter only should be permitted, and also that surgeons who have not much practice in passing the catheter should, in cases of retention of urine, first try a soft rubber instrument because no injury can be done by it. Other injuries are produced by the rough passage of instruments in urethroscopy and cystoscopy and lithotrity—especially in the posterior part of the urethra—and special care must be taken in all chronic inflammatory conditions of this part of the urethra lest these be rendered again acute and thus extend to the bladder. The vesical mucous membrane may also be injured by vesical calculi, but especially by pieces of calculi left behind after crushing. But calculi may remain in the bladder for a long time and injure it and yet no cystitis develops.

The prophylaxis of these injuries consists in the prophylaxis against vesical calculi, against foreign bodies in the bladder, seeing that children do not introduce foreign bodies in play, and in the prophylaxis of onanism.

Next to injury produced mechanically comes retention of urine. This may be caused by different conditions—by stricture of the urethra, by atrophy or hypertrophy of the prostate or of the musculature of the bladder. It may be due to calculi and tumours in the bladder, to acute inflammatory processes in the region of the neck of the bladder, to displacements and tumours of the uterus, or to pregnancy. Lastly it may be caused by trophic changes in the mucous membrane and paralysis of the vesical walls as a result of spinal or cerebral processes. It is less in the acute and the chronic forms of complete urinary retention than in the chronic forms of incomplete retention that regular and early catheterization under conditions of strict asepsis is of the greatest use as a prophylactic. A large number of such chronic incomplete forms of retention may be cured by regular catheterization. In cases of excessive distension of the bladder the urine should not be all removed at once, but only in the course of a few days, so that

the bladder may be gradually accustomed to it. It would seem that incautious catheterization may stir up a renal affection hitherto latent and cause it to progress. Under such conditions the entire urinary apparatus may become congested and an infection rapidly spread over the whole. Retention of urine relaxes the epithelium, causes congestion of the mucous membrane, and thus prepares an easy way for infection. The part played by retention in causing cystitis has been best shown by the classical investigations of Petersen and Guyon, which are complementary one to the other. Both succeeded in producing cystitis in animals when the ureters were ligatured and infectious matter put into the bladder, but Petersen could not produce cystitis by simply ligaturing the ureters, nor could Guyon by only injecting microbes. To prevent retention, the cause must be avoided or treated. For the prevention of urethral strictures, reference should be made to the chapters on "gonorrhoea" and "stricture." For the prophylaxis of retention caused by prostatic disease, by stones, and by vesical tumours, we refer the readers to the sections on those subjects. The prophylaxis of retention due to tumours and displacements of the uterus, and to spinal and cerebral disease, has been given in other parts of this work. Any great and neglected retention will lead to further changes in the urinary passages, and apart from the cystitis which will eventually develop, will lead to hypertrophy of the musculature of the bladder, to the formation of sacculi, to overdistension and atony of the bladder, to dilatation of the ureter, hydronephrosis, pyelitis, pyelonephrosis, uraemia, and pyaemia. The relief of such a retention and the removal of its cause are therefore prophylactic measures of great importance.

Independently of retention, congestive states of the bladder may predispose to cystitis. Disease of the internal female genital organs, of the pelvic connective tissue and of the peritoneum may, as the cystoscope shows, produce congestion of the neighbouring vesical wall. For the prevention and treatment of these, reference should be made to the corresponding sections.

2. Vesical infection takes place in several ways. Most of the infections proceed from the urethra. Catheterization, the passing of bougies and cystoscopy with instruments which are not aseptic, carry various infective agents into the bladder; if there already exists some trauma, as pointed out above, infection of the bladder is easier. It is said moreover to be possible to carry into the bladder by aseptic instruments pathogenic germs which are present in the urethra and thus produce cystitis; as a matter of fact, several pathogenic micro-organisms have been shown undoubtedly to be present in the healthy urethra. But whether these can produce cystitis in such individuals has not been determined by experiments made with these microbes on a healthy individual. We are inclined to think that these bacteria are no longer virulent and live a saprophytic life, and this assumption is supported by analogy from bacteriuria.

The case is otherwise with a diseased urethra. The investigations of Petit and Wassermann show that such a urethra is not free from germs even when after micturition it has been washed out with disinfectants for half an hour. It follows therefore: (1) that, when the urethra is diseased, as little as possible should be done by intra-vesical methods. (2) If intra-vesical methods cannot be avoided, we should do what we can first to wash out the urethra thoroughly. The greatest share of infections of the urethra belongs to gonorrhoea, acute or chronic. Prevention and adequate treatment of gonorrhoea is therefore the best prophylaxis against this form of cystitis. We refer the reader to the chapters on "gonorrhoea" and "strictures," and would here only specially warn against errors in diet, against the injection of substances which are too strong, and against careless injections. For although the sphincter of the bladder reacts promptly to injection when no acute inflammatory condition is present in the urethra, we must not expect the same reaction when there is inflammatory infiltration of the mucous membrane or alteration in the muscle substance. Above all, we must not omit to advise the patients to live very carefully when

improvement sets in; experience shows that this is the time when, through some thoughtless action of the patient, most complications appear. For tuberculous inflammation, see the chapter on "urogenital tuberculosis." From the urethra, infective material may pass into the bladder in women, where the shortness of the urethra makes such infection much easier. We will only briefly refer to the vulvovaginitis of young girls which has been mentioned elsewhere, the cystitis in women with displacement of the uterus and consequent gaping of the urethra, and the cystitis of old women arising from retrogressive changes in the genitalia which make the urethra patulous. Incompetence of the sphincter in the male may sometimes come into consideration in spinal and cerebral affections.

Comparatively few cases of infection of the bladder proceed from the ureters or kidneys. The extension to the bladder of purulent nephritis and of calculous pyelitis, or of renal or ureteral tuberculosis, will be spoken of in the sections on "urinary calculi" and "urogenital tuberculosis." But even when the kidneys are little or nor at all diseased, experiment and clinical experience teach us that pathogenic germs may pass out of the circulation and get into the bladder and may there set up cystitis if the conditions in the bladder are favourable to it. Such cystitis is met with in infective diseases, such as scarlet fever, and disease of the intestine, especially inflammation, intestinal obstruction and constipation. Both forms are met with chiefly in children. Experiments by Lewin and Posner upon animals seem to confirm this. Doubtless many cases of "idiopathic" cystitis belong to these classes. Zuckerkandl is inclined to think that cases of cystitis "from cold" are of the same origin, but this is not yet certain. The same writer also thinks that cystitis is of haematogenous origin in many cases of spinal affection with incomplete retention of urine and chronic intestinal paresis. The prophylaxis of these forms of cystitis is the prophylaxis and treatment of the primary disease, and these are given in other parts of this work.

Lastly, there are the rare cases of direct infection of the

bladder by tubercle bacilli from a caseous focus, and by direct migration of germs (not through the circulation but through the tissues) from a purulent process in the intestines and female genitalia, and by the bursting of abscesses through the bladder wall. The prophylaxis of these forms of cystitis also consists in the prophylaxis and treatment of the primary disease, and is therefore dealt with elsewhere.

Every case of cystitis requires careful treatment. This cannot here be further dealt with; its aim is to remove the cause, and if possible also the changes that have taken place; in acute cystitis this treatment is the best prophylaxis against chronic cystitis, and in both forms it is the prophylaxis against the serious complications which may occur.

For vesical tuberculosis, see urogenital tuberculosis. For retention and incontinence of urine, in addition to what has already been said, see under "hypertrophy of the prostate." For vesical neuroses, see nervous diseases of the genito-urinary tract. For foreign bodies in the bladder, see above under cystitis. For vesical calculi, see the chapter on "urinary calculi."

VESICAL TUMOURS

Practically we have only to consider papilloma of the bladder and carcinoma. The latter may extend secondarily to the bladder, and early operation for carcinoma of the prostate, uterus, ovary or intestine is therefore the best prophylaxis against the development of a vesical carcinoma. Primary or secondary vesical carcinoma, when once developed, is no longer of much interest from the prophylactic point of view. The prophylaxis of primary vesical cancer, which is very rare, consists as far as any prevention is possible in the removal of everything which might be a source of irritation to the bladder for any length of time, such as chronic inflammations, vesical calculi and vesical parasites. The fact should also be borne in mind that those who make fuchsin and have to do with anilin and toluidine, often get vesical cancer, but prophylaxis against this is not possible. The direct and final cause of vesical

cancer is as obscure as that of cancer elsewhere. Vesical papilloma often undergoes carcinomatous degeneration, and should therefore be early removed, both for that reason and because what is apparently a vesical papilloma may sometimes be a papillary carcinoma. From another point of view also vesical papilloma requires to be removed. It frequently gives rise to severe haemorrhage causing cachexia, to cystitis, vesical calculi, and retention of urine. All who have undergone an operation for vesical tumour should be examined every three months with the cystoscope, because of the danger of recurrence.

PARASITES

Several kinds of animal organisms may become parasitic in the bladder. The most important is Bilharzia haematobia, whose ova may be very numerous in the vesical veins. The parasite may cause haematuria, suppurative cystitis and the formation of papillary excrescences which may become malignant, or if they become incrusted and break off may cause the formation of calculi. Prophylaxis against infection with this parasite as well as against filaria sanguinis hominis, which sometimes causes haemochyluria, consists in avoiding the use of unboiled water and of uncooked vegetables and fruits in infected districts.

IV. Prophylaxis in Diseases of the Ureter

The diseases of the ureter are the diseases of the renal pelvis and bladder, indeed they mostly proceed from these. Prophylactic measures against the one are also prophylactic against the other, and there is no necessity therefore to speak specially about them.

V. Prophylaxis in Diseases of the Kidneys

CONGENITAL MALFORMATIONS AND MALPOSITIONS

Congenital malformations, among which absence of one kidney and horse-shoe kidney are of chief interest, cannot be prevented by any prophylactic measures. But their signi-

ficance from the point of view of prophylaxis is very great, because when nephrectomy is undertaken for any reason, such as cancer or tuberculosis, we must first ascertain that a second kidney exists which can carry on the functions of that which is to be removed. This does not however exclude all possibility of error. Congenital malpositions are interesting for the same reason, because they may mislead us in such cases. Of much greater importance is the prophylaxis of acquired malposition, the movable kidney. Slight degrees of this are not at all rare in women. Its aetiology is still a subject of controversy. The kidneys are normally held in position by the peri-renal fat, certain ligaments, the neighbouring organs, the peritoneum, and above all, by the intra-abdominal pressure (Senator). Diminution of the normal, intra-abdominal pressure makes it possible for the kidneys to sink down lower. Descent of the kidneys is therefore met with more especially in women whose abdominal wall has been rendered lax and pendulous by multiple or frequent child-birth, or hydramnios. Working-women especially suffer much from moveable kidney, and this is not due to chance nor probably to the greater opportunity we have of examining them. In working-women the great number of children is proverbial, and a woman who has but just been delivered becomes pregnant again very shortly afterwards. In addition there is the carrying of heavy weights and the pressure of skirts not supported by corsets or suspenders, and this is worse for the liver than the pressure of corsets. A diet which is generally insufficient causes the fat in the mesentery and abdominal walls to disappear, and thus diminishes the intra-abdominal pressure. It is especially the sudden disappearance of the peri-renal fat which is regarded, and correctly so, as the essential cause. That sometimes we find an extensive development of fat around a floating kidney does not disprove this; for the disappearance of this fatty capsule is not the only cause, and the number of cases of rapidly developing wasting is incomparably larger than the number of cases of floating kidney (Senator). Moreover, the diminution of the fat may be very

unequal in its distribution, and the kidney still be surrounded with much fat though all has disappeared from the rest of the abdominal cavity (Henderson, Oppolzer, Prior). The greater frequency of floating kidney in women is also explained by the fact that the liver and consequently the right kidney are forced down by the misuse of corsets. Tight lacing, chlorosis and enteroptosis stand in very close relation with one another, although the question as to which is the primary cause is in each case answered differently by different physicians. The kidneys generally also descend when the other abdominal organs descend. The displacements of the female genitalia are probably as a rule only the result of general enteroptosis, in other cases —certainly in parametritis and perimetritis—they may be the cause of floating kidney by dragging upon the ureter. Further, the pressure of adjacent tumours or the weight of the kidney itself (tumours or calculi) may be the cause of its displacement; trauma is probably the rarest cause. After what has been said about the aetiology, it is self-evident what the prophylaxis must be. We would specially caution against treatment for reducing stoutness, because irrationally followed it causes the peri-renal fat to disappear; especially does this apply to stout chlorotic patients, for whom the best anti-fat treatment is iron; because here there is the danger of chlorosis in addition to that of the acute disappearance of fat. If the floating kidney is not treated, the ureter may become twisted and symptoms of "strangulation" appear. An operation should therefore be undertaken. (nephrorrhaphy) or the kidney should be kept up by a belt. But the belt must be such as to fulfil its purpose, which most do not. Those who wear a belt must avoid all incautious movements, severe bodily work and much shaking; the digestion must be attended to, and more nourishing food taken when there is necessity for it.

CONGESTION OF THE KIDNEY, THROMBOSIS OF THE RENAL VEINS, EMBOLISM OF THE RENAL ARTERY

The prophylaxis of these diseases has been described under the prophylaxis of circulatory disturbances.

DIFFUSE, NON-SUPPURATIVE INFLAMMATION OF THE KIDNEY

All that injures the kidneys is brought to it by the circulation. First come poisons taken into the blood, which produce desquamation of the renal epithelium and inflammation of the interstitial tissues. The sources of these poisons are various. As regards prophylaxis, those are of special interest to us which in small doses are drugs but in larger doses taken continuously for a long time are injurious. The poisons which act upon the blood and thus produce nephritis have already been mentioned in the general section when speaking of the prophylaxis of haemoglobinuria. In children we should if possible avoid the use of naphthol (for scabies the allied preparation eucarin may be used instead), naphthalin, eudermol, picric acid, chrysarobin and pyrogallol. In adults too, the application over too large areas of chrysarobin, pyrogallol, tar, and cantharides, and the irrational use of glycerine, carbolic acid, turpentine, chloroform, sulphuric acid, oxalic acid, mercury and a few other substances may irritate the kidneys. In chronic forms of nephritis mercury and lead have specially to be considered. A physician may therefore be in perplexity when he wishes to prescribe mercury to a syphilitic patient who has nephritis. That nephritis can result from treatment by inunction we regard as quite untenable. On the contrary we may by thorough inunction cure a nephritis which is caused by syphilis. The syphilis injures the kidneys more than does the small quantity of mercury. Naturally, we must avoid excess of the drug. Some of these cases of poisoning may have arisen through their work. They will become rarer as modern hygiene spreads among workmen. But other substances taken in excess with food may also injure the kidneys, causing especially forms of chronic nephritis; these substances are strong spices, mustard, and especially alcohol in the more concentrated forms. Gouty and diabetic kidneys must also be regarded as of toxic origin. Other poisons may be of bacterial origin: in diphtheria,

scarlet fever, acute articular rheumatism, croupous pneumonia, typhus, septicaemia, measles, erysipelas, syphilis, and cholera; even in varicella and epidemic parotitis nephritis may appear. Prophylaxis in these cases is the avoidance of the infective disease, and its suitable and adequate treatment. Where specific treatment is possible, as in diphtheria and syphilis, it should be used. In acute infectious cases especially the patients should be confined to bed till the symptoms have disappeared. The urine should be examined several times during convalescence to see that it is normal. Many a case of chronic nephritis might be prevented if this periodical examination were made. It is well, whether or not there is acute kidney disease, to flush the kidneys thoroughly, as with aerated waters, fruit extracts, and milk, and to excite the activity of the skin. The simplest way of promoting perspiration is by rest in bed; but careful washing does no harm even in the most acute infectious cases. Tuberculosis too undoubtedly produces nephritis, but only the large white kidney. Intermittent fever, chronic suppuration and eczema may also play a part in the causation of nephritis, especially of chronic nephritis. The prophylaxis or treatment of these diseases will also at the same time be prophylaxis for the nephritis. The intestine probably also plays a part in the causation of nephritis. Although we find very few statements in books about this, yet in connection more especially with chronic nephritis, more attention than hitherto should be given to chemical decompositions in the intestine, in which bacteria are largely concerned. It is probably true that, as has been proved to be the case in hepatic cirrhosis, the kidney disease produced by alcoholic excess is the result of abnormal fermentative processes and decomposition engendered by the chronic gastro-intestinal catarrh. Nephritis in pregnancy is probably also of toxic causation because the kidneys of the pregnant woman have to eliminate the metabolic waste products of the two bodies. In such a case, prophylaxis requires that the woman should not soon again become pregnant; when she becomes pregnant again the urine

should be carefully watched; under some circumstances pregnancy should be altogether forbidden.

Other causes of nephritis are very unimportant compared with the large group of poisons. An important influence has been attributed to "taking cold," but whether rightly so, is questionable. One severe "taking cold" is said to produce acute nephritis; repeated getting wet and taking cold are said to give rise to chronic parenchymatous nephritis. This often results from a man's work and can therefore hardly be prevented. From the medical and sanitary side, damp places should not be inhabited. Secondary contracted kidney is met with also after cardiac disease; primary contracted kidney in pyelitis, lithiasis and atheroma. But for most chronic nephritis cases, prophylaxis consists in preventing and in treating acute nephritis.

About prevention of the acute disease we have just spoken. Acute infective diseases need to be watched in this respect. Acute nephritis which sets in suddenly with well-marked symptoms is as a rule diagnosed and treated till the symptoms have disappeared. The danger is in the forms which set in insidiously and probably later are regarded as "physiological," "cyclic," or "periodical" albuminuria. Therefore we should never omit, in convalescence after acute and infective disease to examine the urine from time to time, and this should be done also occasionally with healthy people. The treatment of acute nephritis is purely dietetic: absolute rest in bed, perfectly bland non-stimulating diet, avoiding extractives; above all, milk should be given though not to the exclusion of everything else; slight diuresis should be promoted by vegetable salts and carbonates of the alkalies and by promoting the action of the skin as recommended in the general part for the prophylaxis of oedema. When nephritis is present we should adopt prophylactic measures against dropsy and uraemia. In chronic cases, especially of contracted kidney, attention should also be paid to the heart. The physician has in his prophylactic measures to steer his way between the dangers of cardiac insufficiency and of exciting too greatly the cardiac action in a vascular system which is somewhat brittle. These hy-

gienic and dietetic measures are no less important in the chronic forms of nephritis than in the acute. Further details about the therapeutic treatment of nephritis cannot be given here.

PYELITIS, PYELONEPHRITIS, SUPPURATIVE NEPHRITIS

As a rule the renal pelvis is first affected and thence the affection extends to the renal substance. The converse order of events is also met with but is much less important and frequent. In suppuration of the kidney and consequent pyelitis, the prophylaxis of the renal affection will be important; it may be the expression of a general septic condition or of some disease of the surrounding connective tissue, or of some infection which has entered through a penetrating wound. It is obvious that a penetrating wound of the kidney must be treated according to antiseptic rules. Suppuration around the kidney must be prevented by treating the primary affection, which may be perityphilitis, perimetritis, or spinal caries. When these processes threaten to affect the renal pelvis the same prophylactic measures are required. In a number of infective diseases, microbes or their bye-products are eliminated by the kidneys, and thus the pelvis and often also the renal substance become diseased. Thus we see pyelitis after smallpox, dysentery, typhus, and especially after cholera. The best preventive of such pyelitis is prevention of the infection itself, and a careful watch over the condition of the urine, especially during convalescence. Special caution is needed in the use of some drugs, for example turpentine, copaiba balsam, cubebs, oil of mustard, balsam of Peru, cantharides, tar, and diuretics which may irritate the kidney and the renal pelvis. At least we should, when using these substances, examine the urine from time to time. That pyelitis may be caused also by taking cold seems doubtful, but it is given on the authority of Senator. In women the predisposition to pyelitis from cold is said to be increased by menstruation. The prophylaxis in these cases is self-evident, as also in inflammation of the renal pelvis produced by congestion, as in cardiac and pulmonary

disease, pregnancy and floating kidney. Calculi in the renal pelvis are a very common cause of pyelitis and pyelonephritis; according to their size, form and consistence they give rise to various degrees of inflammation of the renal pelvis and adjacent renal substance. For their prophylaxis, see the chapter on calculi; and for the rarer affections caused by animal parasites, see "parasites of the bladder." In every case foreign bodies should if possible be removed. The most important form of these diseases of the kidney and pelvis is the ascending. Beginning in the lower urinary passages, the infectious process ascends along the ureters to the renal pelvis. All microbic, particularly the suppurating, processes of the urethra, prostate and bladder may extend to the renal pelvis and the kidney. In the general part we pointed out the importance of using aseptic instruments, and also how important is the early treatment of gonorrhoea, stricture, cystitis and all urinary obstructions. The urinary obstruction met with in strictures, prostatic enlargement, and paralysis of the bladder greatly favours the possibility of infection, not only because catheterization is more dangerous than in the absence of such obstruction, but also because intestinal bacteria can reach the urinary passages more easily from the blood-stream, as the experiments of Posner have proved. Treatment of these diseases will at the same time prevent their sequelae. Acute pyelitis must be cured in order that it may not become chronic or attack the renal tissue; when suppuration has already occurred in the kidney, the suppurating focus should be removed to prevent septicaemia. We must again emphasize the necessity of the greatest care when there is so-called "surgical kidney," in letting all operations on the bladder or urethra be non-irritating and aseptic or in avoiding such operations altogether. A mistake may rapidly cause death from "urinary fever." In the severe forms of purulent nephritis there are the same dangers of uraemia and dropsy as in non-purulent nephritis, and they need the same prophylactic measures. In chronic pyelitis every acute exacerbation of the disease should be avoided. The patients must be guarded

against taking cold and this is best done by rest in bed; the food should be non-stimulating, but by this is not meant a milk diet; the patient should avoid alcohol and strong coffee, and the renal pelvis and kidney should be well flushed by the use of milk, skimmed milk, linseed tea, alkaline waters, and lemonade. Stronger diuretics are contra-indicated. Those mentioned remove the acidity of the urine, loosen the mucous secretion of the renal pelvis and are especially useful when the pyelitis has been caused by the uric acid diathesis. Only when decomposition with ammoniacal urine has developed is it permissible to use antiseptics, which in part render the urine acid, such as salol, methylene blue, but not urotropin. The rest is purely a question of treatment. For inoperable cases of pyelonephritis, L. Weber recommends creosote in doses of three to five minims three times daily, as a prophylactic against the danger of septicaemia.

TUBERCULOSIS OF THE KIDNEY

See the chapter on "Urogenital Tuberculosis."

AMYLOID DISEASE OF THE KIDNEY

As we can hardly speak of a cure for amyloid disease, and as treatment, apart from maintaining the bodily strength, can only endeavour to avoid the primary cause or to treat it, a wider field opens for prophylaxis. The cause of amyloid disease is a degeneration of proteid, occurring in several forms of cachexia. The wasting produced by malignant new growths causes the amyloid disease to fall into the background when compared in significance with the primary disease. The early and complete removal of the diseased part whenever possible, is the only prophylactic treatment. The chief causes of amyloid disease are tuberculosis, prolonged suppuration, chronic bullous skin affections, empyema, suppuration in the urinary passages, tuberculous and other diseases of the joints and bones, and syphilis; rarer causes are malaria, gout and rickets. Even when amyloid disease is present, we should treat the

primary cause to prevent further progress of the disease. If malaria be excluded, practically syphilis alone remains, and this may generally be checked by therapeutic measures. The iodides are as a rule the best antisyphilitic drug, because these are generally cases of late syphilis and because mercury tends to increase the existing cachexia.

CYSTIC KIDNEY, HYDRONEPHROSIS AND PYONEPHROSIS

Prophylaxis is powerless against congenital cystic kidney, which is the result of some error of development. But greater importance attaches to prophylaxis in acquired cystic kidney. Every condition which opposes gradually increasing or temporary difficulty to the flow of urine will cause the parts above the site of the obstruction to become distended. It is only a question of the site of the obstruction whether the cystic condition is unilateral or bilateral, and whether in addition to affection of the kidney there is also affection of the ureter, bladder and posterior part of the urethra. Prophylactic measures must therefore be directed at the prevention of an obstruction, or at its removal if possible should it already exist. We should try to prevent or cure the chief cause of stricture, namely gonorrhoea; prostatic hypertrophy should be treated as described elsewhere. In paralysis of the bladder, regular catheterization aseptically carried out is needed. Other prophylactic measures are identical with the measures required for floating kidney, the formation of calculi in the urinary passages, pregnancy and uterine displacements. Malignant growths of the uterus and other pelvic organs, which may cause hydronephrosis, are more important as regards prophylaxis, but also unfortunately more inaccessible than the hydronephrosis caused by them. When there is hydronephrosis, great care should be taken that no pathogenic germs are conveyed to the urethra by instruments, so that the sac may not begin to suppurate. For the same reason (apart from mechanical reasons) the bowels should be made to act regularly. By carefully avoiding everything which could irritate or injure the kidneys, that is by a diet similar to that for contracted kidney, we

may avoid the danger of disease of the renal substance, or in a unilateral but severe hydronephrosis may prevent the sound kidney from becoming affected.

NEW GROWTHS OF THE KIDNEY

The aetiology of new growths of the kidney—and practically we have only to consider the malignant growths—is almost as obscure as that of all other malignant new growths, so that it is scarcely possible to speak of prophylaxis. How far trauma is concerned in the production of carcinoma, is not yet decided. It would better perhaps explain the causation of renal sarcoma. On the other hand, some renal tumours appear to be derived from strayed portions of supra-renal tissue. Since it has been established by Grawitz that Cohnheim's theory as to tumours holds good at least for some forms of renal tumour, it would seem best as regards prophylaxis to avoid everything which might render possible the setting free of imprisoned groups of cells. Trauma if severe enough to cause laceration of the renal substance would surely first do so at the lines of demarcation between normal and heterologous tissues. Trauma acting for long periods of time favours carcinoma; thus we find as a matter of fact, carcinoma following upon renal calculi. Prophylaxis consists in removing calculi from the urinary passages. Let us once again emphasize that in all cases where removal of the kidney appears necessary, the operator should first convince himself of the existence of a second sound kidney.

ANIMAL PARASITES OF THE KIDNEY AND RENAL PELVIS

Prophylaxis is the same as for those parasites in the bladder. A few other parasites, such as echinococcus, cysticercus cellulosae and strongylus gigas are so rare, that it is scarcely necessary to mention them here. The most common is the echinococcus. As a prophylactic, it is best not to keep dogs, or to be specially careful in coming into contact with this animal or in touching the mouth or food with hands which are not quite clean.

PERINEPHRITIS

Inflammation of the fat surrounding the kidney, and suppuration in it are the result of causes similar to those which lead to abscesses of the kidney and renal pelvis, and it also may proceed from similar processes in the kidney itself. Further, we may say that it may be due to trauma, perhaps also taking cold, strains in the lumbar region through excessive work, infective diseases such as scarlet fever or small pox, perityphlitis, perimetritis, subphrenic abscess; also empyema, bronchiectasis, pulmonary abscess and caries of the vertebrae and ribs may all produce perinephritis. From what has been said, it is obvious what are the prophylactic measures.

Appendix to Diseases of the Urinary Passages

1. URINARY CALCULI

Prophylactic measures for stone are directed on the one hand against the development of calculi, and on the other against the secondary affections produced by their presence in the urinary passages. Little can be done against the hereditary predisposition which is often present. If the patient lives in a district where stone is common, it may be advisable for him to remove to another locality. We may also forbid the drinking of water in such districts, although the influence of water on the formation of calculi has not been definitely established and it is difficult to carry out such an order. In connection with uric acid calculi the infarcts in new-born children are of some interest. These infarcts physiologically produced in the uriniferous tubules may not in weaker children be washed away by the urine, as is the rule, but remain at some spot in the urinary passages and give rise to calculi. In such cases it is best therefore in the first few days when the mother's milk is still small in quantity, to give the child plenty of diluted cow's milk to produce greater diuresis. The increased production of uric acid is to-day generally regarded as the consequence of increased destruction of nuclein, especially

from the destruction of leucocytes. But it has not been proved that in the formation of uric acid calculi, uric acid is produced in excessive quantity. Not even in gout, which bears a close relation to urolithiasis, is this always the case. We see that digestive disturbances often accompany the formation of calculi, that renal colic may follow intestinal disturbances, that scrofula and lead poisoning which commence with disturbances of digestion and assimilation, are associated with urolithiasis, that on the other hand digestion much increases leucocytosis, and hence one has to link together these associated conditions. Nevertheless there is still too little definite evidence to permit us to conclude that the formation of uric acid calculi is to be explained by increased production and elimination. For the present we must accept the main conditions for the formation of calculi to be: (1) An abnormal concentration and reaction of the urine. In very acid urine the very soluble sodium biurate becomes the less soluble sodium urate or even uric acid. (2) Probably the absence of substances in the urine which dissolve the materials out of which stones are formed or the presence of substances which throw down the materials that form stones. (3) The existence of a substance which forms the organic framework of all calculi. This probably consists of products of the desquamation of the epithelium, especially of the kidneys and renal pelvis. The process seems to be as follows: first, for one of the reasons given above, uric acid is thrown down, this especially in the acuminate form irritates and causes desquamation of the epithelium; next the stone is formed, and in its turn like every foreign body increases in size by the accretion of fresh urates. When the reaction of the urine is neutral, and still more when it is ammoniacal, as is often the case in bacterial decomposition of the urine, then the phosphates are thrown down and form a layer around the original uric acid calculus. Naturally, this occurs most often in the bladder, where the original stone combined with septic catheterization has produced ammoniacal inflammation. It is evident that phosphatic calculi may be formed from alkaline urine without any previous formation of uric acid gravel. On the

other hand, we are wholly in the dark concerning the conditions required for the development of calculi composed of calcium oxalate, cystine, indican, and carbonates. Preventive measures should therefore be directed especially against uric acid and phosphatic calculi. As to these — patients with a tendency to gravel and stone should be treated much in the same way as gouty patients. One has to try and prevent an excessive formation of uric acid. We need not forbid animal food so as to reduce considerably the ingestion of nitrogenous substances, but we should so far as possible forbid all substances which contain much nuclein, such as liver, brain, spleen, sweetbread, caviare, or yolk of egg. Also we should forbid very large quantities of substances which are not very beneficial such as carbohydrates and fat, and should prescribe a mixed diet containing albumen, fat and carbohydrates in moderate quantities. All the stronger forms of alcohol should be forbidden, and plenty of milk be taken. Everything likely to irritate the kidneys should be avoided, such as strong spices, smoked and pickled food, beer and cider, and all the substances above enumerated as those to be avoided in kidney disease, and this holds good too for phosphatic and other stones. Metabolism must be encouraged by plenty of exercise in the open air, gymnastics and baths (which also act as diuretics). Diuresis should be promoted, and this can best be done by alkalies (potassium carbonate, sodium carbonate, lithium citrate, carbonate or iodide, uricedin, limewater and magnesium borocitrate; the latter is particularly useful when at the same time there is catarrh of the urinary passages. Senator gives the following: Magnes. borocitrat. 50 parts; sacch. alb. 100 parts; ol. limonis, 1 part; a teaspoonful in soda water, three times a day. For the alkalies, we can substitute waters containing alkaline chlorides, or if there is catarrh earthy saline mineral waters. The same effect is produced by artificial mineral salts and certain artificial mineral waters. Besides promoting diuresis, alkalies also reduce the acidity of the urine. But we must not carry this to extremes, and when the reaction begins to be alkaline or neutral the patient should at once discontinue

taking them, otherwise there is the danger of the formation of a phosphatic shell around the uric acid calculus. When there is ammoniacal pyelitis or cystitis or a phosphatic stone, waters containing free carbonic acid and chalybeate waters should be used instead of those containing chlorides of the alkalies or the alkali-earths. Moreover we may try to dissolve the calculi which have already formed by substances which render them soluble. Those recommended for uric acid are piperazin hydrochlorate (7 to 15 grains several times a day), piperidin, lysidin (15 grains several times a day in soda water), lycetol (15 grains in soda water two or three times a day), urotropin (7 to 15 grains several times a day in water), and other substances, but we must not expect very great results. Phosphatic calculi cannot be certainly influenced by the solvents suggested for them (mineral acids). When oxalate calculi tend to form, food containing much oxalic acid should be avoided; these are sorrel, endive, Brussels sprouts, purslane, beans, spinach, tea, and fermented beverages. Yet it has not been proved that these substances can produce oxaluria. Other rules, including those relating to the administration of alkalies, are the same as those given for uric acid calculi. The same treatment is also suitable for the rare calculi composed of xanthin. When there is a tendency to the formation of cystine calculi, which is said to be connected with abnormal decomposition in the intestines, care must be taken to secure a regular action of the bowels. Carlsbad waters, which are also diuretic, are best for this purpose; in addition, we may now and then give intestinal disinfectants (salol, resorcin, or calomel). The general rules for diet and exercise are *mutatis mutandis*, the same in all kinds of calculi. By such means we can in many cases prevent renal colic.

The prophylaxis of stones which form in the bladder requires the removal of all foreign bodies which may have got into the bladder—pieces of catheter, hair-pins, animal parasites, sequestra, projectiles, points of pencils, wax tapers, renal calculi, and ligatures. Ligatures may wander into the bladder from the female genital organs, when left by oversight during an operation. Retention

of urine should, whenever possible, be removed or at least rendered harmless by aseptic catheterization, and vesical catarrh should be treated.

Stones may cause several secondary effects, namely: haemorrhage, pyelitis, pyelonephrosis, renal abscess, perinephritis, urethral, renal and vesical fistulae, cystitis, prostatis, extravasation of urine, urinary abscess, retention of urine, uraemia and hydronephrosis. A stone in the bladder should always be removed surgically, and a stone in the renal pelvis when it produces serious effects. In operative procedures within the bladder we must consider any kidney disease that is present, ammoniacal cystitis, and softness of the bladder wall. It is under these circumstances sometimes necessary, especially in old age, to avoid all interference, or to postpone it till the nephritis or cystitis is better; it is also well first to accustom the bladder to the lithotrite by careful catheterization.

2. DIABETES MELLITUS

Since we do not know the essential cause of diabetes, we can only try to prevent the disease by avoiding those things which experience shows us not rarely lead to diabetes. Among these are gout, obesity, brain lesions from trauma and apoplexy, syphilis, and the excessive ingestion of sugar and of substances which contain sugar. Diabetes shows a great tendency to be hereditary, and it is therefore well not to give to the children of diabetics too much carbohydrate food, and to examine their urine for sugar at regular intervals after the ingestion of amylaceous food; in order that we can treat the disease from its very commencement, and endeavour to prevent the development of other anomalies of metabolism.

Periodical examination of the urine is advisable for every one. When diabetes is present, the chief aim of prophylaxis must be to maintain the nutrition and to prevent coma. Most important is dieting according to strict principles. We could not enter into this more freely here, unless we were to describe the treatment. The chief thing is the restriction of the carbohydrates. But the individual case

must be considered and the mild cases distinguished from the severe. In the latter we must beware of excluding carbohydrates altogether from the diet, and in the moderately severe forms we must continue the albuminous and fatty diet only so long as it gives rise to no trouble which presages coma. In the mild forms, on the other hand, after we have succeeded by strict dieting in eliminating the sugar from the blood, carbohydrates should be again introduced in moderate quantities and gradually increased. No diabetic should ever take large quantities of starch or sugar. The diabetic diet is aided by regular moderate muscular exercise and by proper care of the skin (baths).

There is a tendency to attacks of perspiration and to taking cold afterwards, and it is best therefore for the patient always to wear warm clothes (wool) and in cold weather to go to a warmer climate. Mental excitement must also be forbidden, and exciting work should be given up at least for a time. There is in diabetics a tendency to tuberculous disease, especially of the lungs, which is apt to take a serious course, and also to suppurative and gangrenous diseases; such diseases, and operation wounds should be carefully treated from the very beginning. The diabetic urine should be examined from time to time to see whether the quantity of sugar has increased and whether ammonium carbonate, oxybutyric acid, casts and acetone are present in large quantities. If this is the case, the danger of coma setting in must be prevented by promoting diuresis with alkaline waters, the administration of alkalies in large quantities (8 to 10 drams of sodium bicarbonate a day), with a strictly nitrogenous diet. Owing to the danger of coma and of the serious course which wounds run, surgical operations on diabetic patients should only be made after the sugar has been removed as much as possible from the urine.

VI. Prophylaxis in Diseases of the Prostate

ACUTE INFLAMMATION OF THE PROSTATE

The chief cause of acute inflammation of the prostate is gonorrhoea which extends from the urethra to the prostate. The prevention or proper treatment of gonorrhoea and its

sequelae is therefore also the prophylaxis of gonorrhoeal prostatitis, and we refer the reader to what has already been stated about this. But we would draw attention to the fact that forcible injections are apt to produce prostatitis, and further that at the time (third week) when the gonorrhoeal patient feels better and is more likely to do foolish things, he should be cautioned to be careful, especially about exercise and sexual excitement. The inflammatory process may extend also to the prostate from disease of the rectum (proctitis, fistula, haemorrhoids), of the vesicular seminales and other neighbouring organs; but such cases are rare. The method of prophylaxis must be according to the primary cause. Several other conditions are said to be able to produce inflammation of a prostate which is no longer healthy, or is congested or in an irritable condition. Among these are excessive riding, especially on a bad saddle, injury by instruments introduced into the urethra, urethral calculi, the careless application of caustics to the posterior urethra, the retention of a catheter too long, alcoholic excesses, the use of substances which irritate the urinary passages, coitus, masturbation, forced marches, constipation, haemorrhoids and other circulatory disturbances in the rectum. The chief danger in acute prostatitis consists in suppuration of the prostate, accumulation of pus around the prostate, and rupture into the neighbouring organs and pyaemia. Every means must be used to prevent the development of such serious consequences. We should reduce the inflammation by applications of cold in the rectum and to the perineum or should disperse it by prolonged warm baths and moist compresses. Mercurial ointment may be smeared on the perineum and inner surface of the thigh, local bleeding may be resorted to, and a solution of ichthyol (five to ten per cent.) may be injected into the rectum twice a day. If nevertheless suppuration occur, we should not hesitate to make an incision through the perineum at the very first sign of suppuration, as soon as a soft point can be felt through the rectum, in order to prevent the pus from perforating the capsule. To wait for definite fluctuation would be to lose the most suitable moment. The complete cure of an acute

prostatitis is prophylaxis of the highest order, not only because it prevents the development of chronic prostatitis and sexual neurasthenia, but also because in tuberculous individuals or those predisposed to tubercle, prostatitis prepares a *locus minoris resistentiae* for the development of prostatic tuberculosis.

CHRONIC INFLAMMATION OF THE PROSTATE

Guyon states that gonorrhoea is probably the only cause of chronic prostatitis. We cannot accept this statement. Chronic prostatitis may also arise from vesical catarrh, masturbation, perhaps also from haemorrhoids, trauma (riding) or cold. Nevertheless the treatment of gonorrhoea and the prevention and treatment of urethral stricture is the best prophylactic against most chronic inflammations of the prostate. Many of these are the direct result of acute prostatitis, others set in insidiously and are not noticed during the course of the acute gonorrhoea. Hence the necessity for proper after-treatment of acute prostatitis and examination of the prostate during or after posterior urethritis; yet it must be mentioned that a gonorrhoea which has only affected the anterior urethra may also cause prostatitis.

Although chronic prostatitis may often give rise to no symptoms, yet its treatment is a necessity in a prophylactic sense because experience shows that it is often followed by sexual neurasthenia. We should therefore continue the treatment till with the finger in the rectum, we can press out only normal secretion mixed at most with a few leucocytes. For chronic prostatitis too we can recommend ichthyol injections which, together with massage of the prostate, and hydropathic measures have a very good effect.

TUBERCULOSIS OF THE PROSTATE

See the chapter on "Urogenital Tuberculosis."

HYPERTROPHY OF THE PROSTATE

Prophylaxis in the sense of prevention of the enlargement of the organ is impossible, because the aetiology of the enlargement is still obscure. Those who consider the cause

to be inflammatory conditions of the urethra and prostate we refer to what has been said in the chapters on gonorrhoea, stricture and prostatitis. Those who regard hypertrophy of the prostate as the consequences of arterio-sclerotic processes with secondary, congestion, will adopt measures against the arterio-sclerosis; in commencing arterio-sclerosis, the internal use of potassium iodide is especially to be recommended. Those who consider congestive conditions of the bladder, prostate and surrounding parts to be the chief cause, will employ those measures which will prevent the development of the congestion.

However greatly authorities differ in their opinion as to the cause of prostatic hypertrophy, all are agreed that congestive conditions in those who have prostatitis are harmful, and that in this respect there is a wide field for prophylaxis. As prostatic hypertrophy is a very common disease of old age, and according to Guyon occurs in thirty-four per cent. of all men over sixty years of age, but leads to symptoms of disease only in fifteen to sixteen per cent., if we exclude slightly increased frequency of micturition, it follows that for prophylaxis, old people should be given certain precautionary rules which will help them to avoid congestive conditions in the pelvic organs and serious changes in the bladder. Cold in any form, but especially coldness of the feet, is dangerous. Old people do well to wear woollen underclothing; the bedroom should not be quite cold, so that they may not take cold when they get up at night to micturate. Moreover, old men should be told never to postpone micturition because of *social duties*, or on account of being in bed. Micturition in bed is not permissible, because the bladder is not thereby perfectly emptied and retention may arise in time. Sluggishness of the intestines in severer cases and indeed in all cases is a cause of congestion and should be removed. For this purpose, sulphur preparations are best, and if hypertrophy already exists, cool injections (Guyon). Regular bodily activity, though not excessive, is also good. Very special importance is to be attached to food and drink. A special régime need only be prescribed for those in whom the disease

already exists; nevertheless we may even before this occurs give old gentlemen certain rules, which should be observed for other reasons too.

Alcoholic excess and feasting are not permissible. Experience tells us that after one such excess, retention may set in as a symptom of prostatic hypertrophy which had before not been known to exist. Therefore old men must observe caution at suppers, dinners, convivial gatherings, and such like, which sometimes are followed by venereal excess. New beer, effervescent wines, and highly spiced, salted and pickled food should be avoided. Old gentlemen should eat only one large meal a day and this should not be in the late afternoon; the evening meal should be frugal and easily digestible to prevent abdominal congestion. As soon as the first stage of prostatic hypertrophy, namely functional disturbance without retention, has been diagnosed by the physician, the rules of hygiene for old men, as given above, should be strictly followed. All foods which cause congestion must be avoided; among such are: beer, white wine, strong coffee, crabs, sea fish and asparagus. The same is true also of irritating drugs. For the rest, the rules above given should be followed. It is the quantity of food rather than the manner of taking it which needs to be restricted. Much drinking is always injurious, and Guyon advises those who have prostatic disease, or any vesical affection, not to follow treatment at spas. For the same reason (to avoid pelvic congestion), patients should not be much in armchairs during the day, but should take moderate exercise, and should not prolong the night's rest beyond what is needed by their age and condition. Guyon recommends walking for fifteen to twenty minutes before going to bed, and walking about a little in the morning before the first micturition. The activity of the skin should be promoted by massage, friction and baths, because this relieves the pelvic organs; but baths which exceed a quarter of an hour have the contrary effect. See also the general rules given above for old people. Sexual intercourse should when possible be entirely forbidden.

Special care is needed in catheterization. It is obvious that

this must be done aseptically, and that if self-catheterization is permitted, it should be according to the rules stated in the general part, if one wishes to avoid serious consequences, such as cystitis and phosphatic calculi. In the first stage of the disease, catheterization should, if possible, be altogether omitted; an unnecessary catheterization, whether for diagnostic or therapeutic purposes, may at once increase the mischief and cause retention. On the other hand as soon as retention has set in, catheterization is absolutely essential. Not only may the retention be relieved by regular catheterization, but frequently we can by catheterization restore the condition of incomplete retention. We shall also do good prophylactically by catheterization, because it prevents the congestive symptoms associated with retention of urine, and therefore cystitis and increase of the prostatic hypertrophy and of the retention are rendered less likely. Guyon recommends catheterization even for people in whom there is as yet no retention of urine, but only difficulty in micturition. He advises also that catheterization should be continued only when it relieves frequent micturition; in all other cases it is contra-indicated. The catheter must be passed as often as the patient has need of it. In cases where catheterization produces pain or haemorrhage, a self-retaining catheter is indicated. Acute retention must be removed, but one should first try warm baths and opiates before having recourse to the catheter. But if the bladder is already distended, the urine must be removed under any circumstances by the catheter or by puncture with a trocar. In retention of urine, catheterization must be employed until the retention is completely cured, and must not be discontinued as soon as the patient begins to micturate; for there would then be an incomplete retention, the evil effects of which would be increased by the congestion which results from the efforts made to force out the urine. When complete retention has produced permanent distension and consequently overflow of urine, catheterization is needed for therapeutic reasons; but the catheter should be used with great caution. We must especially caution against a rapid reduction of intravesical pressure, to which

reference has already been made in the chapter on "stricture," against infection which in this stage may make very rapid advance, and against careless catheterization in those who have surgical kidney or are very marasmic. In these cases the tolerance of the urethra should first be increased by the careful introduction of instruments. If nephritis is also present, the case should be treated according to the prophylactic measures given in the chapter on inflammation of the kidney. We cannot go further into the question of prostatic hypertrophy and its complications, as this belongs to therapeutics.

VII. Prophylaxis in Disease of the Vesiculae Seminales

Prophylaxis has only to do with inflammation of the vesiculae seminales, especially gonorrhoeal, and with tuberculosis. The diseases of the vesiculae seminales have been very little studied; they occur mostly combined with disease of neighbouring organs, and the prophylactic measures against them are the same as in disease of the prostate and epididymis, and reference should be made to those sections.

VIII. Prophylaxis in Disease of the Spermatic Cord, Testis, and Epididymis

The skin of the scrotum may be affected by the same diseases as the penis. The chief affections are parasitic, as for instance, erythrasma, which sooner or later becomes complicated with eczema, though the latter may also occur independently. Erythrasma can be prevented by cleanliness and baths, and the eczema also in so far as it is caused by urine (as in scrotal fistula) and perspiration; in addition, inert powders should be sprinkled over the part when there is a tendency to eczema, and ointments should be used when there is a fistula. Cellulitis of the scrotum is the result generally of extravasation of urine. Its prophylaxis consists in the prevention and treatment of the primary trouble (gonorrhoea, stricture, and false passages). It is met with also in very marasmic patients, in those who

have diabetes and nephritis, and atheroma. Here, in addition to prophylaxis of the primary disease, care must be taken to avoid small wounds. The prophylaxis of cellulitis, which results from infective diseases, such as typhoid, scarlet fever, mumps and smallpox, belongs to that of infective diseases. Scrotal fistulae may arise from urinary abscesses, but more often they are caused by suppurating buboes which have burrowed, and by inflammation and abscesses of the testis and epididymis, especially tuberculous in nature, more rarely gonorrhoeal. For their prophylaxis see section relating to those diseases. Special significance attaches to one kind of carcinoma, "chimney-sweep's cancer," which is apt to appear in chimney-sweeps, and workers with paraffin and tar, apparently as the result of irritation by these materials. The disease depends upon the occupation and prophylaxis depends partly therefore upon the choice of a vocation. Here too, daily baths and washing to remove the irritating material act as preventives. Elephantiasis scroti, which is rare in temperate zones, and may also affect the penis, is a disease whose cause is still very obscure. The lymphangiectatic form often found to be caused by the presence of filaria sanguinis hominis in the lymphatics, can be prevented by the measures given above against getting the parasite into the body.

HAEMATOMA

Haematomata may be caused by injury of the tunica vaginalis of the testis.

For purposes of prophylaxis we must bear in mind the possibility of wounding the inner layer of the tunica vaginalis through incautious puncture of a hydrocele and injury of the testis or of a vein. These haemorrhages generally need to be removed surgically, otherwise chronic haematocele with hydrocele, chronic hydrocele, and thickening of the tunica vaginalis may result.

ACUTE HYDROCELE

is sometimes met with after injury, after the injection of irritating substances into the sac of the tunica vaginalis in operating for chronic hydrocele, after over-exertion,

from cold, and the pressure of a truss; more frequently it is the result of urethritis, phlebitis, and cystitis; most frequently it occurs after orchitis, epididymitis, or inflammation of the vas deferens. We meet with it therefore in all infective diseases which cause inflammation of these organs, especially in gonorrhoea. Measures to prevent the primary trouble will also help to prevent this effusion into the tunica vaginalis. Nevertheless when there is great accumulation of fluid, the distress may be so great that it becomes necessary to remove the fluid by puncture. Strict asepsis must be observed in this operation so that suppuration may not arise, though sometimes pus is present from the very beginning. If suppuration occurs a free incision should at once be made, weak antiseptics used, and drainage, as there is danger of spreading cellulitis, peritonitis, or even in the most favourable cases, of the formation of fistulae.

CHRONIC HYDROCELE

Chronic inflammation of the tunica vaginalis of the testis may proceed from an acute attack, may be congenital, or may be the sequela of disease of the testis and epididymis. The prophylactic measures are self-evident from what has been said. When small the swelling causes little trouble, but when large an operation is decidedly indicated, because it is a source of trouble to the patient by the increased weight which it causes. When the penis is lost in a large tumour, micturition may be rendered difficult and impotence caused, to which the frequent co-existing deficient power of erection of the penis contributes. In consequence of the pressure upon the testis the production of semen suffers, hence sterility may exist; moreover, large hydroceles predispose to hernia.

HYDROCELE OF THE CORD

The aetiology is much the same as in the foregoing. One form communicates with the abdominal cavity; and even with that form which has apparently no communication with the peritoneal cavity, we must be cautious in inject-

ing fluids, because a very long, narrow communication often exists.

HAEMATOCELE

Haematocele arises either accidentally through injury or the puncture of a hydrocele, when a vessel or the testis itself is injured, or it may arise independently.

Great importance attaches to it, in a prophylactic sense, because it gives rise to suppuration in the tunica vaginalis much more readily than does the serous form, and it may cause atrophy of the testis; early aseptic excision of the tunica propria is therefore required.

VARICOCELE

This may be prevented to a certain extent, in so far as it is possible to reach the causes which favour it. The veins of the spermatic cord, like the veins of all other dependent parts of the body, become distended by rise of the hydrostatic pressure within them. We find it therefore very frequent when the abdominal pressure is increased by great efforts as in habitual constipation, and in chronic diseases of the abdominal and thoracic cavities, which increase the pressure or interfere with the action of the heart. It may also be due to the pressure of trusses, of the intestine in inguinal hernia, and may occur in consequence of prolonged standing at work, as in bakers. Everything which produces congestion of the genital organs, such as too frequent coitus, masturbation, and diseases of the testicle and epididymis may also cause it. Acute varicocele may be caused by trauma. A varicocele must never be left untreated. The patient can wear a suspensory bandage and thus prevent atrophy of the testicle, diminution of sexual power, some subjective sensations which appear specially after bodily exertion, phlebitis, and thrombosis with their dangers of pyaemia and gangrene. For this reason the old operation of ligature cannot today be recommended, but some of the varicose veins should be excised with strict aseptic precautions. If all the veins are removed gangrene may result.

MALFORMATIONS OF THE TESTIS

Prophylaxis is only possible for cryptorchism when the testical lies in the inguinal canal. In must be removed by extirpation if in no other way, because these retained testes are generally functionless. If they remain in the inguinal canal they may become inflamed, cause strangulation, or become cancerous.

NECROSIS OF THE TESTIS

may be spontaneous, as the result of embolism or thrombosis of the spermatic artery. The prophylaxis for these diseases is given in the section on the prophylaxis of internal diseases. More interest attaches, from our point of view, to those necroses which follow the division of the artery, or complete extirpation of the veins, as may sometimes happen after operations on the vas deferens and pampiniform plexus.

INFLAMMATION OF THE TESTIS AND EPIDIDYMIS

Inflammation of these structures arises either by way of the blood stream, or more commonly through the urethra and vas deferens. The latter course is that taken in the case of gonorrhoea because the gonorrhoeal process extends to the vas deferens. These is no absolutely certain prophylaxis against this; for there are people who are treated in bed from the very beginning of their gonorrhoea and anxiously carry out all precautionary measures, and yet get epididymitis. Nevertheless, in most patients the inflammation does not appear before the end of the second or beginning of the third week. This is the time when not only has the gonorrhoea very often reached the hinder part of the urethra, but also when the patient feels better subjectively and, contrary to medical orders, takes active exercise, drinks much, and last but not least, commits sexual errors. To prevent epididymitis the most careful hygienic and dietetic regulations are needed, and the surgeon should show the patient how to put on a suspensory bandage, made to fit well and provided with thigh straps. The surgeon should also give the first injection. For the rest, reference should

be made to the chapter on gonorrhoea. As gonorrhoea of the hinder part of the urethra is often unnoticed, and thus readily becomes chronic, exacerbations of the process may occur years after infection and lead to epididymitis and to recurrent attacks. These are the cases where the blame is laid on "trauma" and "over-exertion," when it is really due to the chronic gonorrhoea. We have to regard in the same light those inflammations of the testis and epididymis, which are the result of prostatitis and therapeutic manipulations in the posterior urethra, although catheterization, caustics, and the injection of concentrated substances into the posterior urethra are enough by themselves to produce these complications. The prophylactic measures are evident after what has been said. We must be very cautious in the catheterization of a urethra which is still in a condition of inflammation. These affections may also follow upon cystitis, the passage of gravel, and inflammation behind a stricture, the prophylaxis of which has been explained elsewhere. The testicle and epididymis may become affected through the blood stream in some infective diseases, such as mumps, smallpox, malaria, scarlet fever, typhus and pyaemia; as a rule, the testis becomes affected first, except in typhus. For the prophylaxis, see the sections on the prophylaxis of these diseases. In all cases of inflammation of the testis and epididymis, treatment is most important from the point of view of prophylaxis, and should consist first of rest in bed and sedative measures, which, when absorption begins, may be replaced by lukewarm baths and the application of ointments to promote absorption. In an inflammation which follows in the course of an infective disease, suppuration and atrophy should be prevented; in those caused by gonorrhoea, the seminal tubules often become obliterated whether there be atrophy or not, and there may, or may not, be obliteration of the vas deferens as well. If the process is bilateral, the result is sterility. Nevertheless, unilateral gonorrhoeal epididymitis may also very frequently produce absence of spermatozoa, either because there has been an undiagnosed inflammation of the vas of the other

side, or perhaps because the other testicle was functionless. We would therefore point out how necessary it is to treat any remaining infiltration in the testis, epididymis, and spermatic cord, if possible till it has been absorbed. For those who have a predisposition to tuberculosis, hereditary or otherwise, this course is to be recommended, because of the danger of the lodgment of tubercle bacilli in these indurations; general tonic and strengthening treatment is also indicated.

Inflammation of the vas deferens generally accompanies inflammation of the testis and epididymis. For prophylaxis the same course is needed as for the others. If, for example, during the course of gonorrhoea deferentitis appears, we must try by absolute rest, elevation of the scrotum, and ice compresses to prevent the process extending to the testis.

SYPHILIS OF THE TESTIS

deserves special mention, because in the form of gumma it frequently attacks the testis early, and, if it is bilateral and accompanied by secondary induration, it produces atrophy of the testis and sterility, which can only be prevented by timely treatment.

TUBERCULOSIS OF THE TESTIS

See the chapter on "Urogenital Tuberculosis."

UROGENITAL TUBERCULOSIS

In this section we are concerned only with chronic, not with miliary tuberculosis. The several parts of the urogenital tract may be attacked by tuberculosis. This may reach the part (1) by the blood-stream. The tubercle bacillus may remain lodged in the glomeruli of the kidney, also in the vessels and lymph passages of the prostate, the testis and epididymis, rarely in those of the wall of the bladder. (2) It may pass with the urine into the renal tubules ("excretion-tuberculosis" of Cohnheim), renal pelvis, ureters, and bladder. These two modes of infection occur especially in patients who suffer from tuberculosis of other parts. It is extremely probable that a large number of cases among

healthy people arise in this way. (3) Very seldom the tuberculous process has extended to the kidneys from other adjacent parts, for example, from tuberculosis of the ribs, vertebrae, and suprarenals. (4) The tubercle bacilli may also enter the urinary passages from without per urethram. Primary urethral tuberculosis has not been proved to exist, but it is certain that infection may be caused by coitus, dirty catheters, and perhaps also by clothes. The structure of the prostate with its sieve-like mucous membrane will then afford the best breeding place for tubercle bacilli. In the development of urogenital tuberculosis, gonorrhoea is of great significance; chronic gonorrhoea provides places of diminished resistance in the posterior urethra, prostate, bladder, vesiculae seminales, testis and epididymis. In the previous pages we have repeatedly pointed out the necessity for carefully removing any remnants of this disease. We have also insisted on the need of tonic treatment for patients who have any hereditary tendency to tuberculosis, who are scrofulous, or anaemic, who have apical pulmonary catarrh or tuberculosis in any other parts, and who become affected with gonorrhoea. This general tonic treatment may also be recommended as a prophylactic for such patients though they have not yet any gonorrhoea. Such patients should be told by the physician that gonorrhoea would be extremely dangerous for them. If tuberculosis has attacked the urogenital system, it is unfortunately generally only a question of time and idiosyncrasy when and which part of the whole apparatus will become infected from the first focus of disease. For prophylactic purposes, therefore, one should not hesitate but at once remove the whole of the diseased focus, if possible. This is easiest in the case of the testis and kidney, which can be simply excised; in the bladder the tuberculous ulcers must be destroyed by corrosive sublimate or guaiacol. Before removing the kidney we should make sure that there is a healthy second kidney. Early removal of the testis will also protect best against tuberculosis of the other testis and against miliary tuberculosis of the peritoneum. The nutrition of those who have uro-

genital tuberculous disease should be maintained as in the case of those who have pulmonary tuberculosis. In tuberculosis of the bladder and posterior urethra, catheterization should only be resorted to when urgently required, because it often aggravates the disease.

NERVOUS DISEASES OF THE UROGENITAL TRACT

Pruritus pudendorum, and more rarely true neuralgia may affect the skin of the external genitals as the result of a general nervous condition or disease of the urogenital system, such as chronic gonorrhoea, or sexual neurasthenia.

The neuroses of the urethra may be sensory, that is the most diverse kinds of sensation from unpleasant up to painful ones, or abnormal sensations may be present. They may also be motor,—urethrospasm, and urethroparesis; with the former, micturition may often be impossible; with the latter, the laxity of the urethral musculature makes it impossible quickly to force out the last drops of urine, hence dribbling of urine occurs. These conditions are seldom due to disease of the spinal cord or general nervous disease, but are generally due to slight changes in the urinary passages themselves. They are especially due to those changes which chronic gonorrhoea causes in the posterior urethra and prostate, and to onanism with its consecutive irritable symptoms, especially in people with a nervous predisposition. The local nervous disorder may long outlive the morbid process which originated it. We have already given the prophylaxis of the original affections. Less often there may also be present phimosis, a small meatus, abnormal acidity, or some other alteration in the urine (diabetes), or some rectal affection. In passing an instrument we should use the greatest gentleness with those patients who have hyperaesthesia and much pain, and no force should be used when urethrospasm resists the passage of the catheter. Sensory neuroses of the bladder sometimes appear as pain, sometimes as an increased or as decreased desire to urinate. Frequency of micturition may be purely nervous and is very liable to attack neurasthenics, but may also affect

those who are otherwise healthy. We find it also in disease of the bladder, prostate and posterior urethra, with calculi and with phimosis. Sometimes also it may occur in connection with menstruation, pregnancy and other affections of the female genitalia. It may also occur when the urine is excessively acid, and after the administration of cantharides, methylene blue, or urotropin. Only in some of these cases can one speak of a neurosis. Diminished desire to urinate occurs especially in spinal affections.

Nervous dysuria, that is an inability to empty the bladder without obstruction, is met with in spasmodic contraction of the sphincter of the bladder and of the urethra; it occurs more especially in neurasthenics and under conditions similar to those which give rise to urethrospasm. Nervous dysuria may also occur in paralysis of the bladder. In those who are mentally diseased, and in disturbances of consciousness, as in coma, but also when the mind is perfectly normal, symptoms of complete retention or of retarded or difficult urination may appear. The most frequent causes are diseases of the spinal cord; next, neurasthenia, hysteria, and multiple neuritis; but local processes too, such as stone, chronic urethritis, disease of the prostate and stricture, may produce paralysis of the bladder reflexly. Retention of urine from a nervous cause is met with as the result of affections of the spinal cord; often it occurs in hysteria and neurasthenia; it may also occur in those of unsound mind. Independently of the will, the urine then remains in the bladder in consequence of inability of the patient to pass it. Retention of urine may spontaneously or after catheterization give rise to cystitis. Nervous incontinence, in which there is dribbling of urine, is when the bladder is emptied independently of the will, in consequence of loss of tone in the sphincter, with or without paralysis of the detrusor; this is met with principally in diseases of the spinal cord. The expulsion of large quantities of urine occurs in affections of the spinal cord, in loss of consciousness, in epileptic attacks, and very often in children during sleep, as nocturnal eneuresis. In nocturnal eneuresis other factors are

concerned, for example: rickets, anaemia, hereditary mental taint, nervous disease, onanism, intestinal worms, parasitic skin affections, eczema, and diseases and abnormalites of the genitalia.

Renal colic and nephralgia are not always a result of organic nerve disease, or the presence of calculi, but very often they are the first sign of a commencing affection of the spinal cord, as in tabetic crises. In other cases of tabes the pain radiates from a point in the urogenital area. As the cause of tabes is probably syphilis, this should be treated, and any urogenital affection, so far as it admits of treatment.

Nervous functional anomalies of the kidney appear in hysteria in the form of anaemia and scanty urine, and sympathetic disturbance of one kidney when the other is injured. Diabetes insipidus possibly belongs to this category. Nervous oxaluria and phosphaturia are often seen. We should treat the weakness of the general nervous system; but there is no more definite prophylaxis in these diseases, which are still so obscure.

The neuroses of the prostate may appear as hyperaesthesia of the whole organ, or of the urethral part only, or as irritability of the muscular part. General hyperaesthesia of the prostate is often associated with other nervous troubles; the commoner urethral forms are also apt to be combined with motor neuroses. The prostate may also occasion all kinds of neuralgia of the genital area, diminution of feeling in coitus, impotence, spermatorrhoea, and detrusor spasm. Irritability of the muscular part was referred to above in speaking of the bladder. Neuroses of the prostate are met with in neurasthenics, and above all in cases where some local affection has been left by gonorrhoea or onanism.

The testis and spermatic cord are often affected by neuralgia, the cause of which is said to be excess in venere, adhesion of the testicle after operations for hydrocele, narrowing or occlusion of the vas deferens as the result of previous inflammation of the testis and epididymis, varicocele, spinal disease, stone, and the diseases

of the urogenital tract mentioned above, especially of the prostate, and prostatic part of the urethra.

To state it briefly: the nervous affections of the urinary passages have very many causes and require different forms of prophylaxis. Above all, the chief cause of it, neurasthenia, must be treated. This may already be potentially present in the child. But it does not develop apart from external influences, and among them are overfeeding with unsuitable food, wrong training as regards eating and drinking, emotional and mental excitement for which children are not fit, and the air of towns. Other causes are onanism, excessive mental and sedentary work, too little exercise, modern tendencies in music and painting, the foolish hurry in all work, increasing irregularity of life and desire for pleasure, misuse of alcohol and other poisons, and over-valuing of one's knowledge and worth. A sensible training will prevent much of this. Neurasthenia is the more dangerous when it happens to be combined with anaemia, coitus interruptus or chronic gonorrhoea; for these produce changes in the prostatic part of the urethra and prostate which provide the needed local symptoms for patients suffering from general neurasthenia. But other diseases too, of the kidneys, renal pelvis and bladder, especially stone, may sometimes cause neuroses of the urinary passages. The prophylaxis and treatment of these have already been described. Less often do we find neuroses whose cause is an abnormal condition of the urine (increased acidity, phosphates, oxalates, or sugar). All over the body similar symptoms may arise, principally through the action of chemical and thermal stimuli on the sensory nerves, but probably only in individuals predisposed to neurasthenia. Hysteria, which is allied to neurasthenia, acts in the same way, as do also states of exhaustion, as anaemia and chlorosis. Lastly, we must mention disease of the central nervous system, especially of the medulla oblongata, and purely psychical influences as fright, anxiety, or shame. The prophylaxis is obvious from what has been said already.

SPERMATORRHOEA

The causes of this affection are diseases of the central nervous system, especially of the medulla, pulmonary tuberculosis, diabetes, acute febrile diseases, especially typhoid; but above all, general neurasthenia, onanism and organic changes of the posterior urethra through gonorrhoea. The three last-named causes may be associated together and to a certain extent are dependent one upon the other. The prophylaxis of the main affection has been given in another part of this book, and partly also in the chapters on gonorrhoea and onanism. Treatment of the chief affection, especially of the neurasthenia, must be energetically carried out, but into this we cannot here enter further. The treatment of this affection is specially important, because it will prevent the development of severe neurasthenic and hypochondriacal affections and the danger of impotence.

Impotence in the male in which either the erection is absent or incomplete or where there is premature or late ejaculation may be the result of deformities of the penis. Among these are congenital malformation, scars after injury and gonorrhoeal or syphilitic inflammation of the erectile tissue. Deformities of the penis from chancres, cellulitis, abscess, or involvement of the penis in large inguinal herniae, hydroceles or elephantiasis, and lastly tumours of the penis itself may also give rise to these conditions. Details about the prophylaxis of these affections have already been given. General disease may also diminish virility: thus, chronic morphinism, cocainism and alcoholism, diabetes, chronic nephritis, disease of the brain and spinal cord and cachectic conditions. The prevention of these diseases has been described elsewhere. There is greater opportunity for prophylactic treatment in neurasthenia. Neurasthenics are very common, and are for a time impotent, whether the affection has been brought on innocently or by onanism and immoderate sexual indulgence. Combined with neurasthenia, chronic gonorrhoea with its after effects is an important cause, gonorrhoeal neurasthenia as Fürbringer calls it. But simple psychical impotence may also occur.

There may be defective erection as the result of bashfulness, or fear at the first attempt, as by a simple reflex process is not uncommon in young married men. Perverse sexual feelings may at last make coitus impossible. Mental overstrain temporarily at least diminishes sexual activity. The prophylaxis of this form of impotence consists partly in avoiding the excessive mental activity and partly in treating it. Simple psychical impotence which sets in without sexual perversity or previous excessive or perverse sexual intercourse may be best prevented by time and rest. Absolute abstinence, which is also of good effect therapeutically, should be recommended, because it will not be observed if sexual feeling and love become stronger than the mental inhibition, and as a rule will prevent the return of the trouble later. In every case one should caution against forced attempts to supply the deficient erection.

A few words now as to sterility in the male. The absence of any seminal emissions, and deficient ejaculation may be due to the same causes as psychical impotence, but they may also appear as the result of disease of the urethra and prostate; this is generally ulceration, and cicatrization from the openings of the ejaculatory duct to the meatus. Absence of spermatozoa may occur in affections of the central nervous system, in cachectic conditions, in disease or after inflammation of the testicle, and above all by occlusion of the seminal passages as the result of epididymitis or deferentitis. We have already mentioned all these diseases and their prophylaxis. The treatment of a stricture and of infiltration of the urethra is also of prophylactic value.

Sexual neurasthenia comprises those neurasthenic conditions in which symptoms of "irritable weakness," excessive excitability and early exhaustion of the genital nerve centres are primary or specially marked; it is the chief source of all the symptoms mentioned in the chapter on "Nervous Disease of the Urogenital Tract." It has its root in neurasthenia and in the allied local functional disturbances of the urogenital apparatus. Everything which combats neurasthenia acts favourably, because as a rule the psychical effects of sexual affections

do not last long except in neurasthenics. Shame, which unfortunately comes too late, then produces psychical depression, and the patient becomes hypochondriacal and the victim of advertising specialists and publishers of books which paint the results of sexual disease in the darkest colours. Onanism and chronic gonorrhoea may indeed bring about changes in the prostatic part of the urethra, and the cure of these conditions, as already stated, is a good prophylactic of sexual neurasthenia; but upon the whole, mental ideas are the source of these local troubles. Is it not possible to do something to get rid of these "popular writings" and swindling advertisements? The chief source of all sexual neurasthenia due to local disease is the prostate, that is chronic prostatitis. Doubtless balanitis, preputial calculi, phimosis, or a narrow meatus may favour it; but easy as would be then the work of prophylaxis, we have to confess that the effect of these diseases is over-estimated, or as Eulenburg thinks, we attach far too little value to the onanism produced by these diseases though it is certainly much more important than they are. In the general part we have already spoken of the important influence of coitus interruptus, but other sexual excesses, immoderation, and perversities bring in their train physical or psychical impotence, aspermatism, and premature ejaculation. If such conditions have already developed, the physician must remember that he must guard the dignity of his profession. Whether it is compatible with his dignity to prescribe pessaries, and similar apparatus, we leave undecided; in every case it is wrong to advise illegitimate coitus for a sexual neurasthenic. It is especially difficult to decide what should be done about marriage. We may do untold mischief if we tie a happy woman to an impotent feeble man, or a chaste young woman to a profligate. We should not advise a sexual neurasthenic to marry unless we are convinced, after treating him, that he is fit for married life.

The Prevention of Venereal Disease and of Disease of the Skin

BY

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The Prevention of Venereal Disease and of Disease of the Skin

Up to the present, no great results have been recorded in the prevention of venereal disease, and this is due to the difficulty which exists in devising effectual regulations. Yet it is worthy of most serious thought. That things cannot go on as they are is the conviction both of the laity and of the profession. Even amongst those by whom from a moral standpoint the expectant attitude, if not indeed an attitude of opposition to prophylaxis, is taken up in respect to venereal disease, a change of opinion is noticed directly a member of their own family is attacked by the infection. Physicians not seldom have an opportunity of seeing men in distinguished positions who previously had dismissed the subject with a shrug of the shoulders, suddenly awaking to the importance of the matter when one day they make the discovery that a son has been infected with syphilis or gonorrhoea.

The great prevalence of venereal disease and the danger which threatens every one, sometimes even the innocent, make it desirable briefly to review the prophylaxis which is applicable. We must confess, before beginning, that we have nothing new to say and that similar proposals have for centuries been again and again made by medical men. But if legislators upon whom the actual arrangement for defence against these diseases must depend, have hitherto remained deaf to the multitudinous appeals on the subject, that will not prevent us from warning again and again against this dangerous indiffer-

ence, so that the danger may not some day become a pestilence the removal of which will be even more difficult than at present.

Compared with venereal disease the prophylaxis of skin diseases is far less important, and we shall therefore first consider the former.

A. The General Prophylaxis of Venereal Disease.

Corresponding with the three forms of venereal disease, the prophylaxis of venereal disease must comprise the prevention of syphilis, of soft chancre, and of gonorrhoea.

Doubtless all three affections stand in close relation with prostitution. The supervision of this is the only prophylaxis which the State can offer to the individual. Prostitution dates back as far as the history of the world. Only idealists who stand apart from practical life, can hold the opinion that we could do without prostitution at the present day. So long as men exist, hunger and the sexual instinct will always be the strongest incentives to human action. Under the present conditions of existence, which become more and more difficult, it is impossible for each individual to found a family early. Peterson reports (International Conference at Brussels, 1899) that in the year 1890 about one-third of all the inhabitants in St. Petersburg, who were at the age for active sexual intercourse, were still unmarried. For these there is therefore no other way of satisfying their physiological sexual needs than by means of prostitution for the time. There are, in our day, probably few men who enter into marriage in the virgin state. Nevertheless, from the standpoint of prophylaxis one must refer also to the question whether sexual abstinence is injurious for a strong, healthy man. How long such abstinence is possible without subsequent disadvantage will vary according to the natural disposition. The opinion will probably be held by all, that one may counsel such abstinence for a weakly, anaemic individual, or one who is hereditarily predisposed to nervous disease or tuberculosis.

But also in those cases where the man is strong and robust, wise hygienic measures may prevent him from yielding too early to sexual intercourse. Adequate bodily activity, sport of all kinds, and abstinence from alcohol are very helpful in preventing the inclination for sexual intercourse from being aroused too early. Unfortunately, the experience of doctors, especially in large towns, shows that youths of only sixteen or seventeen years of age often have to be treated for venereal disease. Careful inquiry in these cases shows that they had not themselves any inclination for sexual intercourse, but that they were solicited by prostitutes and thus made to exercise the sexual functions. A great mistake is here made in the bringing up of the young, and most parents, teachers and masters draw the attention of those committed to their charge to the dangers of sexual intercourse, only after they are already infected with venereal disease. One should draw the attention of youths to the dangers of prostitution before their sexual inclinations are awakened. It is obvious that the way and manner in which one depicts the consequences of sexual intercourse to the youth, probably of sixteen years of age, must depend upon the individual case and require much wisdom and knowledge of human kind. For, if the counsel is not given in the right way, it may do harm rather than good. Parents and teachers in large towns especially, should not neglect to give attention to this matter. We must be careful also not to depict sexual intercourse as wholly inadmissible and thus by frightening the youth force him into masturbation. Although my experience has led me to the opinion that the injuries to health which are said to be the result of onanism are much exaggerated, yet it cannot be denied that when continually practised, onanism produces neurasthenic conditions. Here again we must give advice suited to the individual case, and so avoid making an abstainer into an onanist.

My opinion is that in a healthy individual with no nervous predisposition, abstinence can hardly produce any disturbance in health whatever. But this presupposes that proper hygiene is at the same time carried out. The unani-

mous opinion of all physiologists is, that up to a certain age, till about the beginning of puberty, the nutriment supplied to the youth's body should be such as will not unnaturally accelerate maturity. The great weight which, especially among the higher classes, is laid upon a diet rich in meat, the addition of spices and condiments, and the early use of alcohol although only in small quantity cause the developement in these boys and girls to occur earlier than in the children of the lower classes whose diet from the necessities of their conditions contains more vegetables and less alcohol. It is self-evident that whenever practicable one will direct sexual intercourse into the right channels by early marriage.

But, as already pointed out, most men yield more or less often to prostitution before they enter into marriage, and the question arises what injurious effect upon health may prostitution exert?

All experienced physicians are agreed that these dangers are very great, and that the sexual diseases which are the result of prostitution do more to sap the strength of nations than all the wars and accidents. There are many statistics which give these injurious effects numerically. Thus, for example, Blaschko believes that every ninth or tenth individual in Berlin has had syphilis. According to his estimate, in Berlin, twenty to thirty per cent. of those affected with venereal disease had syphilis and sixty to seventy per cent. had gonorrhoea, so that the annual figures would give some 30,000 to 36,000 who were suffering from gonorrhoea. In Russia, so Petersen reports (International Conference, Brussels, 1899), in a small university-town twenty-four per cent. of the students who had completed their studies were infected with syphilis, and in a manufacturing town forty per cent. of the employees had syphilis. Naturally, all such statistics have only a relative and no absolute value. But the inference may probably be drawn that, with few exceptions, every prostitute becomes affected with venereal disease at some time or other. It is only a matter of time as to when they will become affected and by which venereal disease. Every time therefore that a man avails himself

of prostitution for satisfying his sexual instinct, it is a mere chance whether or not he will become affected. And this not seldom brings anxious patients into our consultation-room, who after a doubtful coitus come to the doctor daily to know whether they have become infected. The consequences of syphilitic infection are relatively less dangerous than those of gonorrhoea, a point to which we shall again refer later. With the former, prostitutes are highly infectious for those who resort to them for only two or three years after the commencement of the disease. According to the valuable researches of Le Pileur, the greater number of prostitutes become infected with syphilis at the age of eighteen to twenty years, and it seems therefore that the older ones are comparatively less likely to be infectious. But it must be borne in mind too, that it is the younger individuals who are most sought after. The case is different with gonorrhoea, which is seldom or at least not often thoroughly cured during the patient's stay in hospital, undergoes exacerbations through various influences and exposes those who resort to these women to great dangers. But here again more recent hygienic measures and treatment of venereal disease must and can do something to reduce this, though possibly only gradually at first.

From these considerations, it is obvious of how great value, adequate supervision of prostitution would be in the prophylaxis of venereal disease. By it alone will it be possible for the State effectually to check the spread of venereal disease; by it alone can protection, although at present only slight, be afforded to the individual.

In regard to this, there are two opinions which stand directly opposed to one another. The one side regard regulation, the strict police supervision of prostitution as best. The abolitionists, on the other hand, desire to remove the dishonour and shame of such police regulations. Their ideal is to remove prostitution altogether. And while this is being done, the abolitionists desire to see equal rights extended to this class of women as to all other members of society.

Among many other reasons which the abolitionists give for holding this opinion, there are two which need to be specially referred to here. There is first the general moral principle by which every woman may claim the same rights before law as the man. Legislation today certainly does not look upon prostitutes as those carrying on a trade, as the State regards them, but treats them almost as criminals. From the medical as well as from the purely humane standpoint we desire to see an existence fit for human beings provided for prostitutes. Yet this is not the same thing as removal of prostitution, and it is possible only for short-sighted humanitarians today still to maintain that society could exist without prostitution. The second and more important reason which abolitionists give is, that all the regulations which exist today for the regulation of prostitution have done nothing to prevent sexual disease. On the contrary, according to their opinion, registered and controlled prostitution contributes to spread venereal disease.

Upon what opinion is this based? Mostly upon statistics. Yet the general opinion is that all such statistics prove very little. Every statistician arranges these facts from his own point of view, and the results are different, according as he desires regulation of prostitution or wishes to see it abolished. In determining whether regulation of prostitution can prevent and check, or even remove venereal disease, there are many other points to be considered, which statisticians have hitherto not weighed sufficiently. Until such statistics are available, the impression of most physicians is, probably, that careful control and regulation of prostitution is alone able to check the terrible spread of venereal disease. The chief stress here must be placed upon careful medical control, and unfortunately this is altogether wanting—certainly not from any reason which depends upon physicians, but chiefly from financial reasons, and because adequate information is still not obtainable. But it must be confessed that the administrative authorities are in a difficult position, because the measures proposed by physicians differ so greatly and are frequently based upon Utopian prin-

ciples. We must not ask for the impossible, but should begin with measures that can be easily carried out, and later, when these have worked well, proceed to others. But most physicians who have experience in this matter are inclined to think that thorough medical control can alone do any good, and that neglect of control can do very great harm. This experiment in a few countries (Italy, England), where prostitution has remained free and uncontrolled for a few years, has already given rise to serious results. There is however great diversity of opinion about the form of control. One important point is this: Should prostitutes be lodged together, or should they remain scattered and live alone? One side brings forward a number of reasons which show that if prostitutes are lodged together, medical control of the prostitutes will be easier than if they dwell apart. The opponents maintain that in spite of this living together, or even because of it, venereal disease is not rarer in such houses, but even more common than when the prostitutes live alone. After working through the enormous literature on the subject, and with the latest statements made at the Brussels Conference in 1899, one comes to the conclusion that the existing statistics prove nothing, and that no decision can be arrived at from them. To me personally, as to Jadassohn, the middle course seems the best. I am no opponent to lodging prostitutes in special houses; but, on the other hand, I should also support the living alone of prostitutes. I agree with Jadassohn, and think that it is most advantageous to let both systems, isolated prostitution and prostitution in special houses, be carried out side by side. One must be guided by existing conditions, and the arrangements met with will be different in different towns.

In large cities, as in Berlin, the closing of licensed houses has led to an intolerable state of affairs. In towns, as for example in Hamburg, where prostitution is confined to certain houses, the streets remain free from prostitutes. On the other hand, it seems that in cities where the system of licensed houses does not exist, as in Berlin, it is not safe at certain hours of the day for ladies to venture alone in some of the streets. Moreover, it is not astonishing that young people,

students, tradespeople, or workmen, find it difficult to escape such allurements on their way home in the evening. By this removal of licensed houses, prostitutes are forced to get their living on the streets, and often enough a young man who had no desire for cohabitation on a given day has, to some extent, been persuaded into it by the solicitation of a prostitute. In view of this, the barrack-system has many advantages, and these seem to me far to outweigh the inherent disadvantages. Above all, medical control is more easily carried out by the licensed house system. It cannot be denied that this medical and police control requires to be considerably improved in many ways, and that from the medical side the demand for thorough changes must be made.

For it is certain that a careful medical and a humane police control can alone help to check the spread of venereal disease, while with freedom and but slight supervision, secret prostitution, with all its disastrous consequences, will become more common than hitherto. It is estimated at 25,000 already in Vienna; at 30,000 in Berlin; and at about 100,000 in Paris. And it is acknowledged almost on every side that it is secret prostitution which mostly leads to the spread of venereal disease. To limit secret prostitution a humane administration must place the medical aspect in the foreground, and give to it the decision in all technical details. It is obvious that adequate rules can only be devised by consulting those who understand the subject. Sanitary commissions should be appointed in every large town, and should meet from time to time to consider any question proposed. The following proposals, which are mostly to be found in current literature and to which I have made a few additions, are intended only to serve as a sketch, which can be further filled in.

First, we must endeavour to get frequent and careful medical examinations. We need not here enter more fully into the details. For, if for this control trained physicians are appointed, and these can be found in every town, it is obvious that a thorough examination will be made. The only question is, how often should it be made? In this

matter the arrangements in different towns will be somewhat different. The regulation which exists in Antwerp for a daily examination, will be for most towns, and especially large cities, quite impossible. For prostitutes living in registered houses, examinations should, I think, at present be made twice a week; for those who live alone, it seems desirable to examine them three times a week. I must admit that this is to a certain extent only a compromise. If financial considerations could be omitted, a careful medical examination should be made daily. But in order that this may be carried out in the most humane manner, the proposals of Fournier, Neisser and of others, must be considered. The examination and treatment of prostitutes should as far as possible be carried out in the outpatient department whenever it is not necessary that they should remain in hospital. All physicians and authorities are agreed that every prostitute should at once be confined to a hospital directly any form of infectious venereal disease manifests itself. The existing hospital accommodation is far too scanty for this. Physicians will heartily support the suggestion that more hospitals should be built, and that in each of these as large a part as possible should be reserved for venereal disease. In London, according to Drysdale, in the year 1867, with about 6,000 prostitutes, there were only 150 beds for women with venereal disease, while, according to Acton's calculations 1,450 were required, and in the year 1895, 2,500 beds were needed, because of the population, which had become almost twice as great. How very small is this number compared with what is needed. It is sad to see that not only in our small towns, but even in the large cities where there are many hospitals, how small a part is reserved for patients with venereal disease. According to Lesser, there are in the public hospitals of Berlin only the incredibly small number of 153 beds for men with venereal disease, and 410 beds for women. Indeed, it is not even possible for a paying patient suffering from a venereal or skin affection to be admitted into a special part of a Berlin municipal hospital, for the simple reason that there is no accommodation. But in the new fourth

municipal hospital in Berlin accommodation for such cases is to be provided. How long will it be before similar arrangements are made in the older hospitals? Even when sufficient hospital accommodation exists for all prostitutes who have venereal disease, and for others with venereal disease, one essential point has still to be considered. Neither syphilis nor gonorrhœa, especially in women, can be permanently cured by one period of residence in a hospital, even though it extend to weeks. After a shorter or longer interval signs of infection will again arise. With syphilis indeed the first stay in hospital is of very little value. It may be that a few days or weeks later, papules appear on the genitals or some other part of the body, which may readily cause infection. It is therefore necessary either to institute a daily examination of each prostitute in order to send her into hospital when the slightest sign appears, or to treat her at an out-patient department.

Whether daily examination, even in Antwerp, is really carried out, seems to me questionable. Probably it would be difficult to carry it out and it could only be done at considerable expense. And the space and beds in hospitals at present would not suffice, if one were, for example, to compel every prostitute who has had syphilis to go into hospital each time that herpes progenitalis appears. For such herpes, which is innocent in itself, may, when it appears in an individual who has possibly been infected only a short time before, very easily convey the virus, while in a healthy woman there would be no such danger of infection. Moreover prostitutes would by all possible means evade an examination, which already is not liked by them, and it would necessitate so large an amount of police inquiry that the most serious disturbances might be feared.

But the object could be attained by treatment at an out-patient department. The examination of prostitutes would thereby also lose the odium which has hitherto been attached to it, and the place of a police surveillance would be taken by medical examination. We may assume that this would always be done humanely, and the chief physician of such

an institution might be given extensive discretionary power, so that in a given case he might at once secure the admission of a prostitute into a hospital, and in other cases be responsible for the regular treatment of the woman as an out-patient. Whether these out-patient departments should be associated with the hospitals, or should be established independently of the latter, is a question of minor importance. It seems to me that it would possibly be best, if in larger towns we were to establish as many of such institutions as possible, which the women could attend, and where they would receive free medical treatment. There might be such an institution in every district of the town, which all physicians living near might attend if they so wished. The honorarium given to the physicians by the community should not exceed a moderate amount. If there were a head physician over each of these institutions, an arrangement recently introduced into Prague, adequate supervision would have been provided. At the same time, statistics and science would derive many advantages from such a method, and the prostitutes would be more content with such humane treatment than they have been hitherto.

Naturally, one hears from many quarters that these proposals are only half-measures, being directed against the women only, while the other and probably larger section of infected individuals, the men, are not dealt with. I acknowledge that this is so, and would even add from my own experience that men are often a much greater and commoner source for the spread of syphilis than are the women. In many classes of the community it is not considered wrong to seek sexual intercourse though the patient knows the infectious nature of his disease. We may meet with this opinion among educated persons in high social position as well as among working men. Meanwhile we must be content for the present with what is practicable and not desire the unattainable. And at present such examinations are practicable only among women. The fact is regrettable, but for the present we must adapt our measures to it. Let us hope for a change in the future. A few, Kromayer for example, desire a

general compulsory notification of men with venereal disease, but we must remember that such a method would necessitate notification by the physician. Very few patients would go to a physician who notified their venereal disease, even though without giving the name. We ought to be the advisers of patients and bound by professional secrecy. All proposals hitherto made in regard to men, except personal prophylaxis, which will be later mentioned, have proved to be utopian and have therefore failed to be carried out by the authorities. For the present, therefore, we must rest content with a better supervision and examination of the women.

The establishment of institutions in every district might even remove this want which is felt and lamented by many, and the men as well as the women might be treated there and receive free treatment. All such new hygienic proposals obviously meet always with active opposition, often for financial reasons. The question is raised, who is to provide the honorarium for the physicians, and from what fund are medicines to be provided. The following suggestion seems to me worthy of mention. If one does not wish in these cases to ask the State, that is the community, to pay taxes to defray the cost of free treatment of patients with venereal disease in such institutions, one alternative remains, and the patients themselves must pay for this better hygienic supervision for their own welfare. The first proposal, that the money should come from the pockets of the tax-payer, as is done in Sweden, would probably meet with great opposition in Germany and make the whole plan unpopular. The question arises whether the second plan may not be possible.

For a number of years we have had in Germany a sick fund law by which every workman is obliged to join such a fund. By this beneficent arrangement the members obtain from their own funds free medical treatment, free medicine and in case of inability to work, they may demand sick pay or to be taken into a hospital. But prostitution is, as physicians and most lawyers acknowledge, a trade, yet those who practise it have hitherto received scarcely

any protection from the State. Has not the time come when the advantages of this beneficent law should be extended to this trade? Some moralists and abolitionists will raise the objection that such would only increase the evil and possibly tempt girls to follow this trade more than hitherto. This fear need not trouble us, for there is little probability of such a result. We are striving after better hygiene, and to attain this end the method just proposed seems desirable. By introducing cards for prostitutes, or possibly better still by Sperk's number cards, it would be possible to exercise a satisfactory control over prostitutes. The medical entry on the card would state the diagnosis and the day of examination. The raising of the contributions to the fund would be the work of the administration, as is the case in Bosnia and Herzegovina according to Glück's report to the Brussels International Conference. Moreover, Heinrich Severus recommends the formation of such a fund from regular contributions by the women. Great difficulty would certainly arise at first. But the more the prostitutes see that a humane treatment awaits them and the weekly contributions to the fund are only trivial, while much is done for their welfare, the more will they gradually gain a feeling of greater moral independence. They will feel that now at least they are being treated as human beings. When the chief physician of the polyclinic diagnoses some infectious disease in them, their incapacity to pursue their calling must be stated as in other trades. Here also, as is the case with all members belonging to these funds, the physician will decide whether the patient is to be described as incapable of work, or whether she is to be sent into hospital. The latter would generally be the rule, and all cases of suspicious general or local disease which might become infectious should be sent for admission into hospital. A list kept by the chief physician and handed in to the police would enable an understanding to be arrived at between the medical authorities and those who have the supervision. But incapacity for work might also be the result of other non-infectious diseases which have nothing to do with that trade. If a prostitute suffers from an innocent

eczema or psoriasis, she might also while incapable of work receive the benefits of sick aid.

An equally important work of the institutions would be this: that the chief physician could thus best succeed in submitting any who had become infected with syphilis to a prolonged intermittent treatment with mercury according to Fournier and Neisser's method. However much physicians may differ in their views about the principles of treatment for syphilis, yet all are agreed that for prostitutes such a prolonged intermittent treatment should be adopted. From such an institution the physician could send the patient infected with syphilis into hospital for treatment every six months during the first two or three years after infection. I do not agree with Flesch, for I think that the State has the right and even the duty of admitting prostitutes into hospital for treatment. Not only when they are ill, but in the intervals when they are free from symptoms they should be admitted into hospital every six months for mercurial treatment. If the treatment is carried out humanely, all compulsion avoided and the prostitutes belong to a fund, they stand upon the same footing as other members of sick funds. According to the medical view syphilitic prostitutes are incapable of work at certain times and therefore we have a right to ask that they should be admitted into hospital for treatment. The costs which are not covered by the contributions of the women should be made up by contributions from the State and community. Probably private beneficence would also aid in various ways. As infection in syphilitic patients lasts only two or three years, it is easy to see that admission of prostitutes into hospitals every six months is not utopian. It is an object worth striving for, and though we should not see the result all at once, yet we should expect to see a gradual and very considerable diminution in the spread of venereal disease.

Instead of these measures, many have proposed that prostitutes who have become infected with syphilis and have undergone the first stage of treatment should be transferred while they are infectious during the first two or

three years to workhouses, where they would undergo treatment and would not go out till the time when they were very slightly or no longer infectious. Naturally, nothing could be said against such a proposal, if it were not for the enormous expense which it involves and which makes its realization impracticable so far as one can see. It cannot be denied that such workhouses and convalescent homes would be of very great use. When Schmölder maintains that such houses for convalescents are not necessary, one replies that in this way prostitutes can be most easily kept from intercourse during the probable two years of infection and could go back to the hospital for special treatment. The difficulty about financial outlay would be partly settled by the prostitutes, who could be given easy work to do for the community, the State or private individuals. Indeed they might possibly also put aside a small sum which could be handed over to them on their discharge. Moreover we must not overlook the fact that benevolent associations would have a better opportunity than hitherto of influencing the women for good and getting them to follow some other trade. But we cannot deny that the whole matter is difficult to carry out.

But instead of this, special out-patient institutions would for the present exercise a very beneficial influence if they had the discretionary powers which we have pointed out. This would be of advantage not only to prostitutes but also to the numerous women practising secret prostitution, who have hitherto come under no control. The fact that for small contributions to the funds they could get medicine gratis without fear of being notified to the police would surely induce many of these to come for medical treatment when they need it. The unanimous opinion of all specialists, and my own experience coincides, is that these unregistered prostitutes are responsible for most of the spread of syphilitic and gonorrhoeal infection, and yet they have never hitherto had an opportunity of getting medical aid conveniently and without charge. The few private dispensaries which exist for this purpose are quite insufficient. The establishment of district institutions would alone remove this evil.

Naturally as a sequence to this, we must demand that those with venereal disease should be admitted into hospital without payment if they bring a medical certificate. The cost of this would not be very great. By previous systems these in-patients were obliged to pay for themselves; or when they could not, so many inquiries were made and unpleasantness arose, that these unfortunate women with venereal disease were really kept away from the hospitals. This would be prevented if they were admitted free of charge. Unfortunately there is the fact that we have far too few hospitals for the reception of cases of venereal disease. I hold the opinion of most specialists, that it is not desirable to establish special hospitals for venereal disease. But in every municipal or government hospital there should be accommodation for cases of venereal disease, and these should in no way be separated from the rest. This is not the place in which to go into further details about this question. We desire here only briefly to point out suggestions for various improvements. These proposals are not, I think, utopian, and if the administrative authorities will look into them they will find them practicable. In this way we may, in course of time, arrive at better prophylaxis than before. Until possibly a discovery analogous to Behring's enables us to cure, or possibly even prevent, syphilis by a prophylactic specific serum, the sanitation of prostitution is one of the most important tasks for prophylaxis.

Till that is done there remains chiefly personal prophylaxis and this will be described in special chapters, corresponding to the different affections.

1. The Special Prophylaxis of Syphilis

No absolutely certain means by which the individual can protect himself against syphilitic infection is known, nor does it seem likely that we shall know of any such means for the present. Until then the individual can only use palliatives, which only in a restricted sense can be regarded as prophylactic measures. This does not at all mean that unlawful sexual intercourse is deprived of its great dangers by personal prophylaxis, any more than can

the most careful control of prostitutes render those who visit them safe from infection.

Very special significance attaches to the question whether ritual circumcision can be regarded as a protection against syphilitic infection. We know that infection in coitus is never through the uninjured epithelium, but occurs most easily through small lesions which maybe of a very trivial nature, and the thought therefore occurs that circumcision offers great advantages. The normal glans penis, and the prepuce with their delicate epithelium which can so readily become abraded, especially when the preputial secretion decomposes and the parts are not carefully washed every day, enable the virus to lodge there more easily than does a glans which being to some extent deprived of its protecting envelope resembles more the rest of the horny epidermis. Whether such is the case could only be established by many statistics which would show whether those individuals who were circumcised in their youth suffer less from venereal affections than those in whom the prepuce has not been removed. Syphilis and soft chancre only would have to be considered in these statistics. But in most of the questions here mentioned the latter plays a quite unimportant part, so that statistics might be limited to syphilis. Circumcision can afford no protection against gonorrhoeal infection, because the gonococci enter by the normal urethra both in the circumcised and uncircumcised.

It is obvious that such statistics must be very defective and can afford no absolute proof. In such statistics the personal circumstances are too little regarded, and the danger to which the individual is exposed in his sexual life are not accurately estimated. A number of other factors also militate against the worth of such statistics, though there would be an approximate value to be attached to such an investigation. I do not know where any statistics taken for this purpose are to be found. From my own observations I can give the following data:

In my polyclinic, I saw syphilis in 1,250 uncircumcised and in 29 circumcised men.

In my private practice, I noted syphilis in 383 uncircumcised and in 71 circumcised patients.

I avoid drawing any conclusions from these small numbers. For in the first place it must be remembered that the percentage of circumcised to uncircumcised is a small number, about five per cent. of the number of inhabitants. Moreover in the numbers from the polyclinic we have to bear in mind that among the working classes there are relatively very few circumcised. I desire here only to make the suggestion in order that others may possibly also make observations. With a large mass of statistics collected by many observers it would be possible, I think, to arrive at some conclusion.

Ointments may be used to smear the parts before coitus and will diminish the chance of syphilitic infection. By recommending this prophylactic I have often seen good results. Several times patients have, after a suspicious coitus prior to which they smeared the genitals with ointment, sent the woman to me for examination and I have discovered that she has had a syphilitic affection. In spite of this, these men did not become infected with syphilis, as I was able to convince myself by watching them for years. Among these were several doctors who are now married, have healthy children and have never shown any signs of syphilitic affection. Even though no ointment is used, we know that every man does not become infected by a single coitus with one who is markedly syphilitic. Nevertheless it seems striking when one is able to make observations frequently such as I have mentioned.

Instead of this, so-called " preventives " have been recommended against infection with venereal disease. A substance is placed in the vagina before coitus which liquefying or dissolving during the act is to kill the germs of infection. But I have often seen infection occur after the use of such preventives. All these preventives though much praised, but without scientific reason, have been designed not so much to prevent infection with venereal disease as to prevent conception, a question which has nothing to do with the prophylaxis of venereal disease.

Compared with all these precautionary measures, the condom seems to me to afford the greatest security. I do not hesitate to recommend the use of this to each patient who comes to me for treatment, particularly in a large town. It is known that Dr. Conton, a physician who lived in London in the time of Charles II., first gave this invention to the world. I would not from the moral standpoint forbid its use, as did Parent and Duchatelet. I know perfectly well that it is no absolute security against venereal infection; that extra-genital infections more especially cannot be prevented by its use. With the enormous spread of venereal disease to-day, I consider it not only a necessity, but a duty for every physician who is asked about this, to recommend to the patient the condom as a prophylactic against venereal disease.

Formerly physicians held a different opinion on this subject, and in early years I myself avoided answering the question when a patient asked advice about a prophylactic. Now however the more I am convinced of the injurious effects of venereal disease, the stronger grows my conviction that it is the duty of the physician to tell the patient about this means.

A terribly large number of cases of extra-genital infection occur. It is said that in Russia entire villages have thus become infected, chiefly through extra-genital infection. Militchevitch reported that in Servia half the number of cases of syphilis are the result of extra-genital infection. In Germany too, this mode of spreading syphilis is increasing extraordinarily and it is becoming, as Holst says it is already in Norway, a source of increasing danger to many innocent persons, families and children. This *syphilis insontium* has often no relation with sexual intercourse, and innocent individuals often suffer infection from the thoughtlessness of a syphilitic man who gives them a kiss or comes in contact with them in some other way. In fifty cases which came under my own observation and which I published recently, women were more often thus affected than men, and this agrees with the opinion of most observers. The parts affected in order of

frequency were the upper and lower lip, the angle of the mouth, tongue, tonsil, nose, chin, abdomen and anus. In many cases little could be learnt as to the manner of infection. Frequently wind instruments and cigar-holders are the means of infection. Such occurrences might be prevented by observing the very simplest hygienic precautions. The terrible part of this extra-genital infection is that a whole family may thereby become affected, because the victims do not realize the nature of the affection till later, and in the meantime many have become infected.

There is no sure prophylaxis against extra-genital infection any more than against sexual infection. A few hints only can be given. One should avoid kissing on the mouth, for it would seem that syphilitic infection occurs probably only when the infectious material is conveyed from a syphilitic person to an injured place of the epithelium of a healthy individual however slight the injury. I knew of a cook who was acquainted for a year with a syphilitic man without becoming affected. One day when frying with some fat, she burnt her upper lip and a blister formed. The next time her syphilitic lover kissed her the syphilitic virus lodged there. Drinking vessels with any imperfection at the edge, however small, should not be used. It is possible that small injuries in the mucous membrance may be caused thereby, and that shortly afterwards some slight contact, a kiss for example, may infect it with syphilitic virus. So too with chancres through shaving, several cases of which I have shown at the Berlin Dermatological Society.

All such prophylactic measures will however be taken in only a small number of cases. The most important point is to tell the syphilitic person himself how great is the danger of his infecting others during the first two years of his disease. We must earnestly point out to them how great a misfortune they may cause by thoughtlessly inflicting extra-genital infection.

Finally let us point out that many otherwise respectable men resort to prostitutes only after taking excess of alcohol, and pay the heavy price of becoming infected by

this one transgression. The fact should also be widely circulated that immoderation in drink may frequently give the first impulse to venereal excess.

Thus the number of means at our disposal for personal prophylaxis of syphilis is very small, and the value of those given is probably not great. Meantime physicians cannot sit still and do nothing when, with or without the use of all these means, syphilitic infection has occurred. Then must begin our prophylactic treatment for syphilis. Then we can show that we are not powerless against syphilis, but can prevent serious injury to the organism by appropriate and in this sense prophylactic treatment. Here we do not hesitate to say that syphilis is curable in the greater number of cases, and that our prophylactic measures must be directed towards preventing serious and dangerous results.

A large number of statistics and our own observations prove that the best protection against the severe after-consequences of syphilis is to be found in an energetic and long continued treatment of the disease. But treatment should not be begun until the diagnosis of syphilis has been absolutely established. On the other hand, I should recommend that, with but few exceptions, no preventive treatment for syphilis should be begun, because I have seen no advantages result therefrom; but on the contrary, disadvantages. Too often the diagnosis of syphilis is made because of the presence of an ulcer which seems to the physician to be typical. If the further course shows this diagnosis to have been incorrect, the patient is constantly tormented by the fear that he is infected, and in this way a large number of cases of syphiliphobia arise. Just as often the physician makes the diagnosis of syphilis from the presence of the chancre, and possibly some slight swelling of the glands. Specific treatment is recommended, and after one course of treatment no other symptoms of syphilis appear. Then the physician doubts whether he made a correct diagnosis, or the patient thinks that as he no longer has any symptoms, he need undergo no further course of treatment. Such cases are daily met with in practice, and this kind of treatment is responsible for a great deal of

mischief. Instead of giving many such experiences, I will mention one which seems to me of great significance. A merchant, thirty-four years of age, became infected in the year 1893. By the advice of the doctor who treated him, he underwent one course of treatment by inunction before any roseola appeared. When later no further symptoms appeared, both doctor and patient became uncertain whether he had had syphilis. Careful inquiry showed that now and again small fissures appeared on the tongue and lips. The patient ascribed these to much smoking, and they disappeared on being painted with tincture of myrrh for a few days. The patient thought no more about his former illness and married five years after the infection had taken place, and naturally without asking a doctor. Shortly after their marriage his wife began to ail, lost flesh, became pale and had constant headaches. Because of these symptoms, Weir-Mitchell treatment was tried but without success. When, after taking antipyrin, a rash appeared on her, the physician treating the case took it to be a drug-rash. When I was called in I was able to diagnose syphilis by the extensive maculo-papular rash, a marked swelling of the left sterno-clavicular joint, and a periostitis of the cranial bones. Specific treatment brought about the desired improvement in the symptoms.

What does the observation teach? First, that it is the duty of every physician to tell his patient that the prognosis for syphilis is good only when the disease has been treated energetically and for a sufficient time. And in this connection, the so-called preventive treatment of syphilis seems to me to be of little value, because it frequently gives the patient a sense of false security, as he thinks he is free from disease, whereas the symptoms have only been postponed by the early course of treatment. But it is otherwise and much easier when the typical roseola has been diagnosed. Then there can be no doubt about the certain presence of syphilitic infection. The physician can now with a feeling of perfect certainty require the patient to be treated continuously for two years. I believe that if this general treatment were postponed until the appearance of the

roseola, matters would thereby be made much easier for the physician and for the patient. That this delay does no harm to the patient but is rather of benefit is proved by the opinion of many specialists—Hebra, Sigmund, and Zeissl. The above history of a case might give one the opinion, that in this case infection of syphilis occurred after five years in spite of a course of syphilitic treatment, although as a rule it is stated that the infectiousness of syphilis is lost after three or four years. This statement holds good for the majority of cases, but only if an energetic specific treatment has been carried out for two years. In the case described above, there had only been one course of treatment and the infectivity had not been removed. Thus we cannot regard this preventive treatment as really prophylactic, and we are again forced to the conclusion that the best prophylaxis for a later, favourable course in syphilis is firstly, a correct and absolutely certain diagnosis and secondly thorough treatment for two years. This is not the place in which to give further details about the method of treatment; but I may sum it up here in a few sentences.

1. General treatment should not be begun until the roseola appears.

2. The patient must be treated for two years. He should undergo four courses of treatment during the period, one every six months. The first and last courses of treatment are best given in the form of inunctions; for the second and third, for the convenience of the patient, one may give injections. During the intervals symptoms of syphilis should be treated locally, and the glands reduced in size by local applications of blue ointment. The glands should no longer be palpable at the end of the two years' treatment.

3. After this two years' course of treatment with courses of iodide treatment in the intervals, the patient should wait another two years. During this time, we need only attend to the general bodily health. If he has remained free from symptoms, I permit him to marry four years after the infection occurred, and only ask that shortly before marrying he shall undergo one course of treatment as a prophylactic.

4. During the period of treatment, the patient should abstain from all sexual intercourse. Indeed, the physician should constantly remind him that he is a source of infection. Many cases of extra-genital syphilis might be avoided if only the patient were told the very first time he comes for treatment, that every lesion, however small and superficial, may convey syphilis to a healthy individual if it comes into contact with an abrasion however trivial. Great neglect is shown in this respect, and physicians do not always sufficiently draw the patient's attention to the great danger of infection. When the patient has carefully followed out all our directions, and at the end of the treatment asks us whether he is cured, we are in my opinion perfectly justified in answering him in the affirmative. We can tell him that experience proves that the best prophylaxis against subsequent consequences of syphilis consists in thorough treatment of the disease, and that in the great majority of cases no late symptoms appear. We need not be too pessimistic towards the patient. We may permit him to marry after the treatment has been adequately carried out, though making clear to him that we cannot absolutely guarantee his future health.

Naturally, it is possible in some of the cases that the disease has not died out even after four years. Those are however exceptional cases and in no way justify the great difficulty often put in the way of the patient's marrying.

My experience is that no patient who has carefully carried out all these therapeutic measures, and to whom after due deliberation I have given permission to marry, has conveyed syphilis to his wife or children. The patient himself has certainly now and again in later life developed a gumma. When they appear on the skin or the bones, we have an excellent specific means at hand of ridding the patient of his trouble. This possible later appearance of a gumma in the father of a family, who had before been infected with syphilis, is not, I consider, so great a misfortune that one ought to forbid him marrying if he wishes to marry. My experience is that the gumma is not infectious, and

we need only to recognize it early in order to cure it. Obviously when I say the gumma is not infectious, I am speaking from personal experience. There is at present no scientific, incontrovertible proof for this view. But if at some future time, we should obtain certain proof that the gumma may still cause infection, then we should have to accept the fact and act accordingly.

If in considering prophylaxis before marriage we put aside the consideration of the man, we have naturally to use every possible means to prevent the conveyance of syphilis to the woman and the children. Experience teaches that the wife runs less chance of becoming infected in marriage through syphilis than through the after consequences of gonorrhoea, omitting of course cases when the husband has become infected after marriage. We find that the wives of men who were infected some four years before marriage, and who underwent a thorough treatment, seldom become infected. Occasionally however, although rarely, in spite of all prophylactic measures, abortion occurs, and in such cases prophylaxis must be energetically pursued. If in such a marriage abortion occurs it is generally ascribed by the wife or relatives to a purely accidental cause. It may be the woman has had a fright, or some slight accident—all possible innocent events are searched for to which the abortion can be attributed. But when the physician knows that the husband had been infected, conjectures are possible as to the connection between the infection and the abortion. In these cases, prophylaxis may be most valuable. It is the duty of every physician to prove to the husband and to make it evident to him that syphilitic infection has been the cause of the abortion. Both husband and wife should then undergo thorough specific treatment. It is obvious that they will often not submit to general treatment until it has been proved to them that they are suffering from syphilis. And this proof can be found in Wegner's osteo-chondritis of the epiphyses, which it is possible to demonstrate macroscopically. Its presence is incontestable evidence that the foetus suffered from hereditary syphilis.

This sign may be found in the foetus, even when no other sign of syphilis is seen. General treatment commenced at once generally ensures that the next child is born alive. When this takes place, the question arises what prophylactic treatment should be followed in the child. It is evident that so far as the father and mother are concerned, nothing can be done for the child, because they are both already infected; for the exceptions to the law of Colles may here be disregarded. But greater significance attaches to the question as to how the child is to be fed, and whether it shall have a wet-nurse. My answer to the latter question is a most decided negative, because it is very easy for the wet-nurse to become infected. Moreover there is no need at the present time to recommend the employment of a wet-nurse. When the mother cannot suckle the child, excellent results can be obtained if the directions of Soxleth as regards feeding infants are conscientiously carried out.

II. The Special Prophylaxis of the Soft Chancre

This is of much less significance. In the first place, the soft chancre is much less often met with than the syphilitic primary sore; and secondly, it always remains a local affection which may at most be accompanied by a suppuration of the lymphatic glands, a bubo. There is no doubt that if prostitutes were carefully supervised, soft chancre would be a rare occurrence.

We should accustom ourselves to look with doubt upon every sore, however much the clinical symptoms may point to a soft chancre. If we wait to see whether, even with multiple sores, constitutional signs of syphilis appear later, we shall be surprised to see how rare the soft chancre is, compared with the syphilitic primary sore. Neither do I think that we can speak of mixed chancres in these cases, thereby implying that at the moment of infection the individual became impregnated with the virus both of the soft and of the hard chancre. We must be clear about the fact that the present purely clinical signs of distinction between soft and hard chancre do not always suffice

to enable us to establish a certain prognosis after the first examination. Not till we know these infectious agents better will it be possible at once to distinguish between soft and hard chancre. In addition to waiting, there remains "confrontation." I was quite surprised how often in such cases, with the most careful examination of the woman, I met with no trace of a soft chancre but only with the typical symptoms of syphilis. It shows how unsafe is a diagnosis depending on the typical signs of soft chancre.

There is very great probability that we already know the infectious agent, Ducrey and Unna's streptobacillus, and thus may hope that shortly too we shall discover a prophylactic against this organism. Meanwhile, we can only make the same recommendations as for syphilis. In every case the penis should be thoroughly disinfected with soap and water after coitus. Permanganate of potash is best for the purpose, a few crystals being dissolved in a bowl of water. Carbolic acid and corrosive sublimate, which are unfortunately still much used, are quite unsuitable, because they very readily produce erosions which often stimulate venereal ulceration.

I would point out that in individuals with a very short frenum, the soft sore is often situated at that spot. In such patients, fissures of the frenum occur more easily in coitus, and the streptobacilli are then probably able to invade the tissues. I always therefore advise patients who have a short frenum to have it incised.

When a soft chancre has formed, prophylactic therapy is very successful. Following Neisser's suggestion we cauterize the chancre and all its depressions with liquified carbolic acid. Often it is only necessary to do it once, in other cases it needs to be repeated every three or four days till a good granulating surface is formed. Since treating these sores in this way I have seen fewer buboes than formerly among the working classes. I then apply iodoform as the disinfectant which is surest and permits healing most quickly, and for which I know of no real substitute.

III. The Special Prophylaxis of Gonorrhoea

It is only since Nöggerath pointed them out, that we have thoroughly understood the harmful results which gonorrhoea may cause not only in the man but also in the woman. Previous to that, it was always said that gonorrhoea was an innocent affection from which many men suffered in their bachelor days but which passed off without leaving any results. Even if Nöggerath overstated the matter somewhat, nevertheless he gave the impulse to more exact inquiries into the injurious effects which gonorrhoea in the man sometimes and even often produces upon the health of the woman. Gonorrhoea is, as Neisser says, a very common disease in so-called civilized countries, probably the commonest except measles, and it is certain that thousands and tens of thousands of men and women in every civilized country are ill and permanently affected in health and ability to work, who owe their ill health to gonorrhoea. We must therefore support all efforts, which aim at the prophylaxis of gonorrhoea and which combat a disease still unfortunately too often regarded as a mild affection.

When Crédé, by dropping a two per cent. solution of nitrate of silver into the eyes of newborn infants, almost entirely succeeded in preventing ophthalmia neonatorum, the thought occurred that its use might be extended to gonorrhoea in man. The first attempts of Haussmann brought discredit upon the method because the injection of a two per cent. solution of silver nitrate into the urethra, which he recommended often gave rise to purulent urethritis. Blokusewski recommended that after a suspicious coitus two drops of a two per cent. solution of silver nitrate should be dropped into the urinary meatus and a third drop be allowed to run outside over the frenum. The reason for the latter is the following: Not seldom, patients tell us that they did not notice any gonorrhoea after the ordinary incubation period of two, three or four days, but that the gonorrhoeal discharge appeared after a week or sometimes even later. Though at times certainly

this late appearance of discharge is explained by lack of observation, yet it cannot be denied that this late incubation sometimes occurs. Blokusewski thought that the explanation might be that the gonococci in these cases have not entered the urethra but have lodged outside on the frenum and only later pass into the urethra. To prevent such an invasion, a third drop was to be put on the frenum.

The further directions proposed by Blokusewski have this for their object—that as soon as possible, within a quarter of an hour after coitus, two or three drops of a two per cent. solution of silver nitrate should be dropped into the fossa navicularis after previous urination. After a quarter of a minute it may be washed away with water. It is important that urination should be complete, and if the urethral orifice is closed for a time by laying the finger upon it (not pressing the sides together) the secretion in it will be washed out. If urination is not possible, the secretion in the fossa navicularis should be removed by washing with water. If the solution is not dropped in till later or is forgotten, a longer application (half a minute) is useful. As a rule, protection is afforded even after a few hours. In order that the application may be properly applied, Blokusewski constructed a portable dropping glass which can easily be carried in the pocket. The question whether with this prophylactic it is possible to prevent gonorrhoea is one difficult to answer. It is certain that the method can do the patient no injury whatever. For most patients say, that after dropping the silver nitrate solution into the urethra they feel a slight burning for a few minutes at most, which soon passes off. One cannot say with absolute certainty whether all patients can bear this prophylactic. It is possible that the silver nitrate might set up irritation in a few individuals. In one case observed by E. R. W. Frank a urethral discharge associated with pain followed the adoption of Blokusewski's method.

Although I have not myself met with any similar case, yet it needs to be considered even though it be exceptional. Frank therefore made trials with protargol, which Neisser has recommended as an excellent prophylactic

in gonorrhoea. His results definitely proved that the action of a twenty per cent. solution of protargol in glycerine for five seconds shortly after coitus afforded absolute protection against gonorrhoeal infection. This method, compared with Blokusewski's silver nitrate method, has the advantage of being quite free from irritation, and as Frank rightly points out, the protargol method has the further advantage that it can be carried out directly after coitus, without any previous manipulation. The application is made by means of a small, portable drop bottle. As a prophylactic, two or three drops of the solution should be passed into the orifice after coitus, and if very special precaution is to be taken, they may also be used before coitus, though it is not absolutely necessary. Another drop should be put on the frenum in order to render innocuous any gonococci lodged there. Men with a tight prepuce which cannot be retracted would do well to wash out the preputial sac with protargol solution. Sometimes, according to the observations of Welander, a mucous discharge may appear twelve to twenty-four hours after the use of the protargol, but it is not associated with the slightest subjective trouble and disappears after twelve to twenty-four hours without any treatment.

One may probably say to-day that a twenty per cent. protargol solution is to some extent a prophylactic against gonorrhoea.

Even if gonorrhoea cannot in every case be prevented by this prophylactic, yet it is of great value if it is effectual as a preventive in many cases. It is the duty I think of physicians, if asked, to make this prophylactic known. Prostitutes should be instructed to wash out the vagina with protargol solution every time before coitus.

Great stress should be laid on the prevention of gonorrhoea, and all endeavours must be directed to this end, because when gonorrhoea is once established we have no such sure means of treatment and often months elapse before any real result follows.

The abortive treatment of gonorrhoea is less useful. In many cases, certainly, protargol is of great service, but

it is not an absolute specific. In a large number of cases I have found that patients who came to me very early with subjective burning and painful sensations in the urethral mucous membrane after a suspicious coitus, and in whom although there were no objective signs of gonorrhoea, I used protargol, were completely cured. Such patients who observe themselves very carefully notice a burning sensation in the urethra six to twenty-four hours after coitus, they have the feeling as if the urethral mucous membrane were somewhat swollen and congested, and they notice some little turbidity in the urine, not any pus but small flakes. In these cases, in spite of the use of protargol, I have found that a drop of pus issues from the urethra on the second or third day after the coitus, in which gonococci can be plainly proved to exist. Naturally it sometimes happens that I make a mistake and that in two or three days no gonococci are to be found. In that case I do not count the patient among the gonorrhoeal cases, and acknowledge that I was mistaken in my diagnosis of gonorrhoea. Certainly I have not done the patient any harm by my treatment. On the other hand, in those cases where gonococci are found after two or three days in spite of the protargol, the result has generally been excellent. At the Congress of the German Dermatological Society in 1898, I reported the favourable results I had had with this early treatment of gonorrhoea, and I can now add to these results. In some fifty cases which were carefully observed, not only had the gonococci disappeared after four or five days, but the gonorrhoea was cured in three or four weeks at latest. But in a few cases, the gonococci did not disappear till much later, and the cure of the gonorrhoea was much delayed thereby. Perhaps the protargol treatment had not been commenced early enough in these cases. My impression is that protargol is followed by this good result only when used at the very earliest stage. If gonorrhoea has existed already for a few days, I have often enough observed that the result of protargol treatment is very slight. It would seem that protargol is of value only in cases which come very early for treatment.

I then always combine it with an astringent, and order

in addition to the protargol solution (1 in 200), Ricord's solution (zinc sulphate and lead acetate, 1 of each in 200 of water).

The protargol is used morning and evening for the prolonged injections which Neisser recommends, and Ricord's solution twice during the course of the day. After having micturated, the patient should syringe out the urethra by means of a syringe containing ten cubic centimetres of lukewarm water, should then inject the protargol, lie down in bed and hold the solution in the urethra for half an hour if possible. Even very busy patients can spare that amount of time morning and evening, while during the daytime I recommend that Ricord's solution should be kept in the urethra ouly for five to ten minutes. Equally good or even better results were obtained by B. Goldberg with Janet's injections of potassium permanganate. He considers this treatment a sure method for arresting commencing gonorrhoea.

It must then be our endeavour to accustom patients to come as early as possible to the physician, in order that they may at once be treated in this energetic way. My experience in this respect is precisely the same as in the treatment of the soft chancre. Many patients already know that as soon as a soft sore appears, touching it with carbolic acid is useful and may prevent the formation of a bubo. And equally good results follow, when patients come for treatment very early for supposed gonorrhoea.

Here and in other venereal diseases, this knowledge should be more widely spread among the public. It is sad to see in a large town, how many not only of the rich, but also of the poor, carry their hardly-earned money to the quack to be treated by him for venereal disease. The great benefits of the German sick-fund law, by which patients are able to have free treatment, though not unfortunately in all of them sick pay when ill with venereal disease, are still far too little valued by members of the fund. We must therefore strive to get sick pay from all these funds for their members which are unable to work owing to

venereal disease. Moreover, all classes of people should be taught the nature and prophylaxis of venereal disease.

We are much indebted to Zadek and Blaschko for a few clear, brief statements for this purpose. It seems to me, however, that the advice given by them for the prevention of venereal disease is still too elaborate, and therefore not read so much as it should be. I would summarize the teaching as follows :—

1. Illicit sexual intercourse with registered or unregistered prostitutes is seldom free from danger. Most of these persons, or almost all, suffer from gonorrhoea or syphilis, and there is great probability that men who visit them will become infected with venereal disease.

2. If one exposes oneself to the danger of this intercourse it is recommended to smear the penis with ointment and more especially to use a condom, and to wash the parts thoroughly after sexual intercourse.

3. Directly any one notices the very slightest thing wrong with himself, he should at once consult a physician who can nowadays do very much to cure the disease if it is recognized early. Quacks of all kinds often do much harm, and should be carefully avoided.

More detailed advice and information about the duration of infection and the method of treatment, say of syphilis, should be given personally by the physician, and he can in this way do much good by kind, yet energetic and impressive teaching. But to print all the advice and instruction, and put it into the hands of the patient, seems to me not advisable, because most patients do not read long statements or pay no attention to them, but are very receptive of verbal advice.

B. GENERAL PROPHYLAXIS OF DISEASE OF THE SKIN

Skin diseases are of far less importance in regard to prophylaxis. The reason for this is that we know too little about the aetiology of most skin diseases. Very few have been sufficiently investigated from the aetiological standpoint to enable us to adopt a prophylaxis based thereupon.

The skin, the most important organ for regulation of

metabolism, naturally requires very great care. In this respect ablutions and baths are valued far too little from the prophylactic standpoint. In early childhood it is often carried to extreme, and many children in their first year of life receive a full bath daily, and in addition are washed all over in the morning and evening, which is almost equivalent to three baths a day; but this is strikingly changed in later life. There are small towns where there is no convenience for baths even for those who would like them. An enquiry made by Lassar shows there is one institute for warm baths to every 3,000 persons instead of one to thirty, as should be the case.

Towns are much more favourably circumstanced than the country. One cannot sufficiently express one's astonishment that in two-thirds of the kingdom of Prussia the people have no public warm-water bathing institute, and that of 338 Prussian districts, 96, or thirty per cent. are without bathing institutes. According to this calculation, in about two-thirds of the German Empire, some five million people, or about one-sixth at least of the inhabitants, are unable to have a warm bath for purposes of cleanliness. Lassar's efforts therefore to establish numerous cheap baths for the people deserve the widest and completest support.

The money expended for such prophylactic purposes would surely bear much fruit. The shower baths for the people, first introduced by Lassar, in which everyone can get a warm or cold shower bath, with soap and towel, for a penny or three halfpence, ought to be established not only in many public places, but also in schools and factories. These would be of the greatest service, because most people feel a great desire for cleanliness, but have no opportunity to satisfy it.

In addition to water, great value attaches also to the soap. By it the fat on the surface of the skin is emulsified, and then only can one speak of real cleanliness. With a normal skin no great stress need be placed upon the kind of soap used. All soaps are indeed combinations of fatty acids with alkalies. The alkali present in excess

dissolves the superficial horny layer and cleanses the skin as it helps to remove mechanically the uppermost horny cells which may be regarded as almost dead.

But if there is any slight sensitiveness of the skin, an irritation or a real inflammation, the use of alkaline soaps as generally sold must be forbidden, and a neutral soap be used. The centrifugalized soaps should then alone be used. I recommend these for very susceptible, delicate skins, for instance in women and children, and also when there is a tendency to inflammatory dermatoses and after these have been cured. But I have never seen any very striking good results follow from the use of medicated soaps. It is obvious that ointments prescribed by the physician, with ingredients in definite proportion, have great advantages over these soaps which the manufacturer supplies but which cannot be controlled by the physician, as regards the proportion in which the ingredients are present.

Ointments and fats are far too little valued as prophylactics for the normal skin. The custom of the old Greeks and Romans of anointing their bodies after bathing would be very good for many people, especially children and women, but also workmen. Many cases of intertriginous and trade eczema might be prevented if this custom were again introduced. Indeed, it is possible by a slight addition to the fats, to make these ointments antiseptic. This would be of the greatest use in preventing those forms of dermatosis, which we know to be parasitic. The laborious investigations of E. Breslauer have proved that ointments which contain soluble disinfectants, possess bactericidal properties. Vaseline, fat or oil should not in these cases be used as the basis, but only lanolin and unguentum leniens. For an antiseptic effect, watery ointments should be recommended; but for inflammatory conditions and for anointing the body and preventing roughness of the skin, ointments made of vaseline, fat or oil should be used.

Special Prophylaxis of Skin Diseases

There is no need, I think, in the present stage of our knowledge of prophylaxis to mention each dermatosis separately. With many, we should be obliged to mention again and again our total lack of knowledge. But a few groups may be singled out the aetiology of which we know and the prophylaxis of which is therefore also known.

In addition to the group of trade-eczemas, we shall consider parasitic and endemic dermatoses.

1. TRADE-ECZEMA

Trade-eczema is the commonest dermatosis which we meet with in hospitals. In some trades a large number of the workmen are affected as a result of their work, after having been engaged at it for a longer or shorter time. Generally the cause is some substance which acts upon the skin, producing an artificial dermatitis which is catarrhal in character.

I have been able to show from my polyclinic that among 940 cases of Eczema, 499 were cases of trade-eczema. In locksmiths, tinsmiths, and blacksmiths we often see impetiginous eczema on the hands and forearms, and on the face and ears. The metal dust on the skin, and the irritation of acids which are used, more especially in soldering, are the causes of it, in addition to the action of the open fire. Eczema rimosum is common among smiths and locksmiths, because they have to handle heavy tools. Painter's eczema attacks the hands and forearms. Here the cause seems to be the poisonous nature and irritating properties of the colours. Among cabinet-makers, furniture polishers and varnishers, the injurious agent is the furniture polish. The irritating substances in these are probably the methylated spirit, rancid oil, prepared chalk, pumice stone, sulphuric acid, and the so-called Vienna polishing chalk. Eczema in aniline workers is to be attributed to the chemicals used, the eczema of masons to injury by the cement and lime and to working out of doors.

We do not know what are the conditions which determine whether in any individual case the workman will or will not get eczema. Of two workmen apparently of similar constitution and similar skin, the one does his work for years without becoming affected, while the other gets eczema after a short time, and a third begins to be ill after several years. It is the same with drug-rashes. Some individuals will bear a drug well for years, while in others it brings out an eruption at once. We are forced, in trying to explain the appearance of this eczema, to take refuge in the word predisposition. We must believe that some workmen have an idiosyncrasy towards certain chemical influences.

The word "delicate skin" really means not much more than that. For the eczema of the surgeon, which is also a trade-eczema, the prophylactic measure we adopt is for the operator to rub his hands thoroughly with fat every night, but there are not many opportunities of getting workmen to do this. In the first place, the patients come to us only when they are already ill; and in the second place, in their unfavourable social position they are not able to carry out directions and grease their hands every night. We are therefore mostly confronted with the eczema, and the question arises, what have we then to do.

It is certain that in many occupations the observation of hygienic measures, and when possible the wearing of elastic gloves, will sometimes prevent eczema. We know that in trades in which turpentine is the injurious agent the better kinds of turpentine will sometimes prevent the development of eczema. This is especially the case with cabinet-makers. But in most workshops the French turpentine, which is less irritating, cannot be used because it is too dear. Besides turpentine, other injurious substances of a chemical nature, as stated above, are harmful in cabinet-making. The spirit is methylated for use in this trade, and the question is often asked whether the eczema among cabinet-makers is due to this addition. I have made many enquiries, observations and experiments in regard to this, and am not convinced that the methylated spirit is the real cause of the cabinet-maker's eczema. I

believe that the substances named above are the noxious agents. From this it is obvious how difficult it is to suggest any measure to prevent this trade-eczema.

It would certainly be an advantage if hot water and a neutral soap were placed more often at the service of workmen while they are at their work. Moreover, those workmen who suffer permanently from eczema should be supplied with a fatty mixture which they could always rub into their hands after work. The English preparation of glycerine and honey-jelly is especially to be recommended, because, after rubbing a small quantity of this on the hands, no fatty residue is left on the skin as is the case after using vaseline or glycerine, and the workman can resume his work directly afterwards. Thus, at least in some cases, prophylaxis is of value, and many an eczema can be prevented from recurring. But there remain a number of cases of eczema in which it always re-appears year by year after the patient has been for a longer or shorter time at work. We can generally obtain good results by treatment, but when the workman resumes his work the eczema breaks out afresh. In these cases, after prolonged observation and treatment, we are obliged to advise the workman to give up his work and take some other employment; this is very regrettable, because it is often very difficult for a workman who is skilled at his trade to get his living in another way. There is, however, no alternative left us.

Naturally, this applies to a few cases only. In most we can, by treatment, obtain very good results. In addition to treatment by acetate of aluminium, pastes of zinc and tar are very useful. Even after the eczema is cured, we advise the workmen to continue prophylactic treatment for months longer, and we then order a simple ointment to be applied every night. Guided by these principles we can obtain very satisfactory results.

K. Herxheimer has recently described a special form of trade-disease. He observed a chlorine-acne. The cause of the severe acne was free chlorine. The patient worked in a place where caustic potash was made from potassium

chloride by electrolytic action. The free chlorine probably penetrated the wall and was breathed by the workman. Acne resulted through the breathing of the gas and its elimination by the sebaceous glands. It ought not to be difficult to prevent this by better protective precautions.

Compared with trade-eczemas, other eczemas which we know to be caused by irritating substances are far less important. In eczema of the lips one should bear in mind that ordinary mouth washes and tooth powders—for instance, odol—contain ethereal oils, which may exercise a permanent injury on the lips and neighbouring parts coming into contact with it. Such chronic peri-oral eczema, often lasting a long time and constantly recurring, is very obstinate to treatment, but often heals rapidly when the injurious substance is omitted. The Röntgen ray dermatitis, which has been recently observed, may be avoided by a little care if the patient is not exposed to the rays for too long a period at a time, and the focus-tube is held at the right distance from the skin. These injuries were more frequent when the X-rays were first discovered, and with the care now observed are less frequent. In the same way the injurious effects produced by electric light may be prevented by care.

It is less easy to prevent the injurious effects produced by staying too long in the sun. Possibly we can prevent this eczema caloricum which attacks so many people by following Unna's suggestion, of protecting the face and hands with tincture or collodion of turmeric against the blue and violet rays. The parts protected with the turmeric remain pale.

In contrast with this, cold plays a much less important part when considered from the stand-point of prophylaxis. At least those injurious effects which appear on the hands and feet, chapped lips or chilblains, may often be prevented by adequately protecting the parts against cold. We should also remember that general weakness and marked chlorosis favour the development of chilblains. For chapped hands it is sufficient to apply glycerine honey-

jelly every night for some time, while a surprising and comparatively rapid improvement of chilblains is brought about by chlorinated lime ointment (1 in 10), as recommended by Binz. The general health should also receive attention.

Balanoposthitis or herpes progenitalis, which recurs in many individuals, will often readily yield to drying powders (for example, boric acid or dermatol). Many men in whom the inner surface of the prepuce is very sensitive, often get recurrent attacks because they wash this part, which is very similar to a mucous membrane, too roughly with soap and water. One should steer between overcleaning and total neglect of hygiene, because conversely, in many individuals who have much smegma, herpes progenitalis or balanoposthitis, may arise from decomposition of secretion. In every case, probably, if there is much sensitiveness of these parts, it is well, after having washed, to apply boric acid vaseline.

Besides the eczemas above-mentioned, intertriginous eczema, especially in the inguinal fold, occurs often in children and also in adults. It may be a source of trouble to the patient for months, tends always to recur, and not rarely the eczema may spread thence over the whole body. Much can here be done by way of prophylaxis. I have already hinted above that too much washing and bathing of children may often be the cause of such an eczema. We should see that the parts are well powdered or smeared with an unirritating ointment—for example, a five per cent. boric acid ointment. In adults excessive perspiration at these places gives occasion for the first appearance of eczema intertrigo. Therefore, it is apt to recur after it has been cured if the exciting cause still remains. Not only in the inguinal folds, but also in other parts of the body, as the axillae, eczema may be caused by excessive perspiration, and also deep-seated suppuration in the sweat glands. Similarly, rhagades may develop on the feet as the result of excessive perspiration, and be a source of great trouble to the patient. The only way of preventing recurrence of these affections is to remove the excessive perspiration of

these parts. The objection still met with among the laity against checking perspiration, because of a fear that it will give rise to internal troubles, is beginning to disappear. All those fables that checking the perspiration will drive the disease in may be energetically contradicted. The best prophylactic against intertriginous eczema, which at the same time cures the hyperidrosis, is the liquor antihydrorrhœicus of Brandau. This liquid is corrosive and should be diluted according to the part of the body for which it is used. For the axillae and inguinal folds it should be diluted with an equal quantity of water, and pieces of linen, dipped in the solution, should be laid upon the diseased parts for a few minutes. Boric acid vaseline should be applied directly afterwards, and the treatment should be repeated about twice a week. Even in severe cases improvement soon sets in. If there should be a recurrence the same method of treatment is again applied. In some cases we can, instead of this, paint the part with formalin or dust it with tannoform.

There is much greater difficulty in preventing the formation of callosities, which develop not seldom on the hands and feet of workmen and of others. In those cases where the individual has to work hard with his hands and such hyperkeratosis develops, the aetiological factor is obvious. But there are a number of patients who are engaged in writing or are occupied as salesmen in shops, and who yet suffer from severe forms of tylosis of the hands, and often also of the feet. These are a source of much trouble, both to the patient and to the physician, and in spite of all we can do we can often not cure it, or it frequently recurs.

In slight cases we can apply some form of fat nightly, or ten per cent. salicyl soap plaster; in severer cases a thirty to fifty per cent. salicylic acid plaster often gives good results. This will not always cure severe cases. Then sometimes I find that prolonged use of the liquor antihydrorrhœicus of Brandau, or painting daily with liquor carbonis detergens causes improvement. The result is however always a little disappointing; here is an opportunity for

chemistry to help us with some new, energetic, keratolytic substance.

Lastly, we must mention local argyria and siderosis. With silversmiths very small particles of silver get into the skin, are there oxidized, and blacken the elastic fibres. In a similar way, in millstone-makers and in millers and stonemasons, small round brownish-blue spots develop on the extensor surface of the hands and fore-arms, being caused by particles of steel which penetrate the cutis. The only prophylactic would be efficient protection of the hands against injury while at work by the use of gloves or finger stalls. The workmen would of course object because they would not be able to do their work so well.

2. PARASITIC DERMATOSES.

Next to eczema, prophylaxis is most important in the case of those skin-affections which can be conveyed from one individual to another by contagion.

In these cases the aetiological factor gives us the clue to the preventive treatment. Otherwise we know of no specific prophylactics against the various dermatoses, and can only apply the principles of general hygiene.

(*a*) Vegetable Parasites.

Among skin diseases produced by vegetable parasites, the greatest importance prophylactically attaches to tinea barbae. It is very common at the present day, and sycosis is frequently met with in large towns, both in private and in hospital practice. We know that it can be avoided by cleanliness and strict aseptic precautions, and it is therefore obvious how important in this respect prophylaxis may be. Tinea barbae is mainly spread by the barber, and the other sources of infection are insignificant in comparison with this. To prevent it, a barber should never shave anyone in his shop who is evidently suffering from tinea barbae, and he has the right to refuse to shave anyone whom he suspects to have this disease, but he can of course shave him at home if he observe the following pre-

cautions. It is necessary that he should have his own razor, as indeed should every one who goes to a barber, and his own shaving brush and towel. I consider it best that each should apply the soap himself, so that the barber has only to apply the razor, previously put into hot water, and to shave. After the shaving, the individual should himself wash his face in the washing basin. Powders should be avoided in barbers' shops, because infection may readily be conveyed by the powder puff. Or, a piece of wool only should be used, dipped into the powder and thrown away directly after use.

Infection with tinea barbae is especially apt to occur with barbers who have a large clientèle, and these precautionary measures would considerably lighten the barber's work and the individual would be protected against infection. It would also be of value if every barber were obliged to disinfect his hands in a bowl of a solution of corrosive sublimate (1 in 1000). For, one can see in the barber's shop how little attention barbers pay to their own hands. They go from one person to another and shave, without washing or disinfecting their hands. They merely dry their hands on a towel. In this way infection can easily be conveyed. I have known a case where the patient had the same barber come to his house to shave him with his own razor for seven years, and even then one day he caught tinea barbae. Therefore I advise that the barber should thoroughly disinfect his hands in a bowl of corrosive sublimate lotion. I believe that even a very busy barber could find time enough to do this, whether at the house of his client or in the barber's shop. It is obvious also that his linen and his nails should also be clean. The only alternative which the public have when the barbers will not observe these precautions, is to shave themselves.

Meantime we should endeavour more and more to make these prophylactic measures as widely known as possible, because tinea barbae is a very troublesome skin-affection. It may, after it has existed for a longer or shorter time, lead to a very serious result, namely, sycosis parasitica. When this happens it will take long to cure. Therefore at the very first appearance of the disease, active prophylactic

treatment should be at once commenced. The earlier and more thoroughly the fungus is removed, the more likely is it that the development of the severer parasitic sycosis will be prevented. As soon as the disease has been diagnosed, and this is easy both clinically and microscopically, it should be painted with five per cent. chrysarobin-traumaticin; painting the part twice or thrice during a period of three or four days is often enough to effect a cure. If the patient shaves during this period, I order the rest of the face to have corrosive sublimate solution applied to it by means of a piece of wool dipped in the solution, before and after shaving. In this way it is generally possible to prevent the development of sycosis.

Sycosis non-parasitica has nothing to do with this affection. Its aetiology is still unknown. Some have described cocci and bacilli as the exciting cause, but no proof has yet been forthcoming of this; and the question arises whether these may not have appeared secondarily to the morbid process. One often finds that people with thick, bristly hair with a thick growth of beard get this form of sycosis more easily than people with soft, fine hair. Our endeavour must be to commence thorough prophylactic treatment at the very first appearance of sycosis, and when a cure has been effected, we must forbid the growing of a beard for a long time, because sycosis appears anew when the patient allows the beard to grow again. Sometimes he ought not to grow a beard till several years have elapsed, and even then recurrence is not excluded. In sycosis non-parasitica of the upper lip we should not omit to treat the chronic rhinitis, which is mostly associated with it.

Tinea cincinata affords a very favourable field for prophylactic measures. We know that this affection develops in many people who wear next their skin woollen underclothing which has lain for a long time in the dust, for example, in a shop or cupboard. The fungus does not appear to effect a lodgment unless the patient perspires a great deal; probably the fungus invades the macerated epidermis. We should, therefore, as a rule, advise such people not to wear newly-bought things until they have been

washed. The affection is a comparatively slight one and can easily be cured.

Tinea on the scalp is, in Germany at least, much less important. We see it very seldom, and it is interesting to note how the body at different periods becomes less suited for the lodgment of trichophyton. Thus tinea tonsurans occurs only in children, while adults may have fungi on other parts of the body without the head being affected. In other countries, for example, France and America, tinea is so common that an entire school has sometimes to be closed. The physician's chief aim here must be to prevent the infected child from coming into contact with the rest of the children, and to cure the disease quickly with chrysarobin or with antiseptics.

Favus is of less importance as regards prophylaxis. For the danger of infection is far less than with tinea tonsurans. Sometimes one sees a child in a family affected for years with favus, yet none of the others become infected by it. Our aim should be to treat the disease energetically as soon as it is diagnosed, to prevent any danger of infection.

General rules of cleanliness and care on the part of the parents or attendants are sufficient for this. The general rules of hygiene have accomplished so much. that in many countries favus has almost died out. In Germany we seldom see a case of favus, and when we do chance to see one, it has generally come from other countries. Here again an early diagnosis is required in order to get good results from energetic treatment and to prevent its further spread.

Pityriasis versicolor, too, has no great prophylactic significance. Even though it has been proved that this affection is caused by microsporon furfur, and it has been experimentally conveyed from one individual to another, yet this does not occur in ordinary life. If a little attention is paid to the skin, there need be no fear of infection either from this disease or from erythrasma or eczema marginatum. The patient should be quickly cured of his trouble, and there will be little probability of his affection being conveyed to other members of the family.

(*b*) Animal Parasites

The prophylaxis of dermatoses produced by animal parasites is comparatively simple.

Acarus scabiei, the exciting cause of scabies can only live in the skin of man. Protection against it is fairly easy. One need only avoid all intimate contact (for example, sleeping together) with one who has scabies and one will escape infection. When the patient is warm in bed, the acarus comes to the surface of the skin and so passes from its original host to the skin of another. One does not get scabies by merely touching one suffering from it, for example in shaking hands. The question is often considered, whether one can get scabies by wearing the clothes of one suffering from scabies. As a rule, the question may be answered in the negative. Nevertheless there is the possibility that the eggs may lie in the clothes of one who has scabies, develop there, and be conveyed then to a healthy individual. It will probably however be a rare occurrence. Therefore, I consider the disinfection of the clothes of one suffering from scabies to be unnecessary as a rule. It is sufficient if the clothes are thoroughly beaten and hung in the air for twenty-four hours. The matter is different when tramps are admitted into a hospital on account of scabies, then their clothes may be disinfected. Here there is the probability that in addition to scabies, there are other animal parasites, especially lice, which can be destroyed by disinfection. Compared with the conveyance of scabies from man to man, its conveyance from animal to man is rare. Occasionally however it is conveyed from the cat. This seems to be an exceptional event, and it can be as easily cured as the ordinary scabies.

In contrast with these, pediculi (capitis, pubis and vestimentorum) are ectoparasites. Their life conditions do not require that they should remain in the skin of man, but they are able, after having sucked the blood they need, to live upon the human skin. They can therefore be conveyed by intermediate hosts. Infection with head lice may occur through the use of a comb or the hairbrush of one who has

pediculi; infection with body lice through the wearing of the patient's clothes or by close contact with him. In these cases disinfection is naturally needed.

In conclusion, a few dermatoses must be mentioned, the exciting cause of which is not yet known, but which are clinically proved to be contagious. These are impetigo contagiosa and verrucae.

Impetigo contagiosa, as was first pointed out by Tilbury Fox in 1864, can be conveyed from children to adults or from adults to children. One therefore meets with it generally in several members of the family or at least in several children in a house. Recently we have often seen it follow primary vaccination or revaccination. In diagnosing so-called vaccination rashes, physicians should among other things bear in mind the possibility of impetigo contagiosa. Probably, in spite of all precautionary measures, infective agents are conveyed to man through the animal lymph from the calves used for the purpose. At least, in the calf lymph used for vaccinating, a coccus has been found which was proved by culture to be hitherto unknown. Only those lymphs should be used which we are convinced have been most carefully prepared. Children with impetigo contagiosa should be forbidden to go to school, and the part will heal quickly with white precipitate ointment.

Among the public there has always been a belief in the infectious nature of verruca vulgaris, but this opinion was not shared in scientific circles. No infective agent has yet been found, yet the experiments of Jadassohn and O. Lanz prove that it may be conveyed and will develop often after a very long incubation period varying from one and a half to six months. The best protection against auto-inoculation, which here comes in question, is early removal of the first wart by the sharp spoon or by caustics.

Similarly, foot and mouth disease in cattle may be conveyed to man, though here again we do not yet know what is the exciting agent. Yet the thorough investigations of Bussenius and Siegel undoubtedly prove that the infective material of foot and mouth disease may be conveyed to man

effect a lodgment there and cause disease. This is shown by experiment, by epidemics and by records of infection of individuals. Experience hitherto has shown that the predisposition of human beings to infection with this disease is but slight. Strict regulations should be adopted by the police authorities to prevent and forbid the sale of milk of diseased animals. Probably the infected germs in milk may in most cases be destroyed by mere boiling, and the disease is therefore rarely conveyed. The infection of an individual from a diseased animal can be prevented by the simplest precautions.

3. ENDEMIC DERMATOSES

Prophylaxis is equally successful against these. They occur endemically in some countries and districts. The aetiological factor is definitely known in some of these diseases and in others can be fairly surmised, and the spread of the disease and its extension to other countries can therefore be prevented. For this purpose an international law relating to epidemics is needed.

In comparison with other diseases most can be done by prophylaxis for leprosy. This is some slight consolation, because we are powerless to do anything when the disease has once fully developed, and we do not yet know any means of influencing its course. We know that the infection of leprosy takes place only from man to man. The danger of infection seems not to be great and the simplest rules of antisepsis often suffice to prevent infection. When, as in the case of nodular leprosy, open ulcers are present, in which the bacilli are freely exposed, it is natural that transmission from one individual to another may take place, more especially if they live in the same house. It becomes then a family disease in the truest sense of the word. In families where one member is being treated for leprosy, we can diagnose it early in any other member of the family from the presence of symptoms which under different conditions would not make it certain that leprosy was present.

Schäffer's recent interesting researches concerning the

spread of the bacilli of leprosy from the upper respiratory passages prove to us that this increases the danger of infection of leprosy. According to these researches, it seems that thousands of bacilli are scattered about in speaking, coughing and sneezing by a leprous patient whose mucous membranes are affected, though not necessarily severely. The dissemination of these bacilli cannot be prevented by therapeutic measures. Though these researches are not very reassuring, there is the fact that the conveyance of leprosy from one person to another takes place only when ordinary precautions are neglected; and though we know that experienced physicians, such as Danielssen, have never, in spite of years of experience in the Lungegaards Hospital at Bergen, seen a definite case of infection of leprosy in any of the attendants or doctors, yet the facts given above testify that isolation of the lepers is the only proper prophylaxis.

It must be confessed that this seems a little cruel. But looked at more closely, this measure is seen to be necessary and can be carried out humanely and for the benefit of the patient. They are not to be isolated in prisons but in hospitals, where the patient is surrounded by all modern hygienic methods. Moreover, most leprous patients come from the very poorest classes of society and would not be giving up anything if they were admitted free of charge. On the contrary, the family would be relieved of a heavy burden. In some countries, Brazil, Columbia and Uruguay, leprosy is so extensive an endemic disease that cases occur also among the better classes of society, and for these isolation would not be a benefit but a punishment. But in the interests of others, they too must conform to the regulations for isolation. Much may be done by humane methods to alleviate even their lot. Thus, one of my patients who became infected with leprosy in Montevideo and whose pecuniary circumstances are very good, has now received permission to live in a house of his own near Rostock.

All well-meant reasons which are urged against isolation are removed by the overwhelming fact of the statistics which we have from other countries.

Norway takes the lead. Here, in consequence of isolation

regulations, leprosy has steadily decreased from year to year, and one institution after another has been closed for want of patients. Indeed, Hansen has calculated that at the present rate of decrease there will probably be no more cases of leprosy in Norway by the year 1920. In view of this important fact, there can I think be no doubt about the justification of the isolation of leprous patients. The regulations must be humanely carried out. There should be frequent visiting times. In the less infectious form, anaesthetic leprosy, where there are no open sores to be an extra danger to those around, patients may even be permitted to visit their homes, if the healthy inmates there follow the ordinary rules of antisepsis. For it must be remembered that leprosy is infectious only when the patient is for a long time in close contact with those around him.

We are less favourably situated with regard to the prophylaxis of pellagra. It seems fairly certain that pellagra appears only in those countries (Moldavia, Wallachia, Friuli, Roumania and Italy) where the people are compelled by bad harvests to live chiefly upon maize, sometimes diseased maize. But it is not easy to find a remedy, because in those countries maize is used not only as a substitute for bread, but is also used in the preparation of spirits. The higher the prosperity of a country rises, the greater the demands of the people in living, and the more civilization advances, the rarer will pellagra become. It is the duty of the governments of countries affected with this disease, by all means at their disposal to prevent the results of bad harvests, to forbid the use of diseased maize and to substitute healthy grain for it.

Lastly, verruga peruana must be mentioned. This disease endemic in Peru seems dependent upon unfavourable telluric and climatic influences in valleys which run parallel with the coast, are free from winds, and in which severe fevers are constantly present. R. Ruge states, that in Peru the disease is generally attributed to the drinking of water, when the snow melts, out of the ravines of Agua de Verrugas, which is 40 miles from Lima and 6,000 feet above the

sea. Here the only prophylaxis can consist in drainage to divert the over-flowing rivers, and in providing more suitable conditions of life for the people of the country, and this can only be done at great expense.

4. THE PROPHYLAXIS OF DISEASES OF THE HAIR

has hitherto received far too little attention. I am certain, from my own experience, that one could do much by careful hygiene of the hair. Those cases where young people between twenty and thirty lose their hair and become bald would disappear entirely if proper attention were given to the hair when still healthy. Most people however do nothing at all in this respect.

The question is often put to us, whether frequent cutting of the hair has any good influence on its growth, and it must in my opinion be answered in the negative. If we consider the physiology of the growth of hair we have no ground for assuming that there is any such influence. A short time ago, Bischoff made some careful experimental investigations into this question in various animals, and the result showed that cutting the hair exercised no influence upon its growth.

It is quite another question whether by improving the general nutrition one can influence the growth of hair. I have no hesitation in replying in the affirmative. It is obvious that when the hair falls out considerably, the patient's general condition should be enquired into. Often I have seen excellent results when in addition to local treatment, attention was directed also to the anaemia, and the patient's diet was improved. In the treatment of skin diseases the physician is needed as well as the specialist. The proposals about food recently made by Deichler seem to me to be capable of influencing the growth of hair. For such patients, he places gelatinous foods in the foreground, and orders soups to be taken which have been made by boiling together two parts of meat and one of bone. Instead, one

may also use gruel; in short, it seems to me also that, in addition to local treatment of the scalp, gelatinous substances given for a long period will have good results.

Early treatment is very necessary for premature alopecia, which is one of the commonest diseases of the hair. Often patients come for treatment far too late, after there has already been considerable loss of hair. The dandruff which has been present for years is regarded as accidental, yet a complete cure can only be attained when this pityriasis or seborrhoea sicca has been treated. Nevertheless, in many families premature baldness seems to be hereditary. Here all our methods of treatment are often of no avail. But in the commoner cases, where the first symptom of disease is seborrhoea and the loss of hair is only a secondary factor, prophylaxis is important from the fact that the spread of seborrhoea from the head to the other parts of the body may be prevented. We can here do very much by prophylaxis. Unna was the first to point out that a form of eczema which he termed seborrhoeic eczema spreads from the head gradually over the whole body. Although according to my experience the frequency of this event is much exaggerated, yet it cannot be denied that this does occur in many cases. We do not yet know the aetiology of this seborrhoea, the organisms, morococci, which have been found are probably not pathogenic; nevertheless there is no doubt that clinically we have here a special morbid process. I do not agree with the view recently put forward by Török, who regards seborrhoeic eczema as a special form of psoriasis. It is well therefore to treat early any slight seborrhoea which may appear as a prophylactic measure against loss of hair.

Experience has also taught me that we can prevent trichorrhexis nodosa by prophylactic treatment. Contrary to the generally accepted opinion that this disease is of parasitic nature, I believe it is caused by dryness of the hair, and that the micro-organisms found are secondary. At least, I have obtained excellent results in trichorrhexis, both recent and of long duration, by the following treatment: The face and hair must not be washed with soap, and

a hair wash containing fat must be used. The following can be recommended :—

Castor oil, 5 ounces;
Rectified spirit, ½ ounce;
Oil of roses, 6 drops.

or

Glycerin, 25 parts;
Lemon juice, 5 parts;
Eau de Cologne to 100 parts.

(Unna).

From the prophylactic standpoint, I attach great importance to the ordering of hair-pomade or hair-oil. Even when the hair is still healthy and there is no evident loss of it, or when there is a loosening of the hair, I order the patient to use a simple pomade. I do not send the patient, as so often is done, to a drug shop or perfumery to buy a pomade whose composition I do not know, but consider that it is absolutely essential to order the ingredients which it is to contain. The simplest pomade is that recommended by Débay:

Lard, 60 parts;
Oil of almonds, 4 parts;
Balsam of Peru, 2 parts;
Tincture of Benzoin, 1 part.

Some patients prefer an oil, and for these one may recommend almond oil with which has been mixed an alcoholic solution of tannin.

It is obvious that after using these fats the scalp must be cleansed, so that the fat may not undergo decomposition. Washing with water or soap is of no use for this purpose, but water and spirit should be used, which may also be added to the substances used to promote the growth of the hair. I often use the following hair-lotion :—

Tinct. cantharid., 10 parts;
Spirit. lavand., 100 parts;
Spirit. rosmar., to 200 parts.

But these alcoholic lotions can only be used often when the hair is naturally greasy. If the hair is always dry, it

needs fat. We should then rarely order an alcoholic mixture but would prescribe a hair-lotion, for example:—

℞. Chloral hydrat., 10 parts;
Glycerin, 20 parts;
Distilled water, 200 parts.

If such prophylactic treatment founded upon a rational basis is adopted for disease of the hair, and the general condition of the patient receives attention, good results are obtained. But even here, we have to remember that there are limits to our powers.

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